MILITARY REVIEW

MAY 1945 · VOLUME XXV · NUMBER 2

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FORT LEAVENWORTH, KANSAS

A MONTHLY REVIEW OF MILITARY LITERATURE

MILITARY REVIEW

ENGLISH EDITION

Starting with the April (last month) issue, the Command and General Staff School broadened its scope by publishing the MILITARY REVIEW in three languages, namely English, Spanish, and Portuguese.

The articles that appear in the Spanish-American and in the Brazilian editions will be found that same month in the English edition.

This notice is to acquaint our readers with the fact and to insure our Spanish-American and Brazilian neighbors that it will be our most sincere endeavor to translate the English text faithfully, and to produce, to the best of our ability, a magazine that is authoritative, informative, interesting and instructive.

The Editors

EDICION HISPANOAMERICANA

Con el número del pasado mes de abril, la Escuela de Comando y Estado Mayor amplió sus actividades con la publicación de la MILITARY REVIEW en tres idiomas: español, portugués e inglés.

Los artículos que se publican en las ediciones hispanoamericana y brasileña aparecerán en la edición norteamericana del mismo mes.

Por medio de estas líneas, deseamos hacérselo saber a nuestros lectores y, asegurarles a nuestros vecinos de Hispanoamérica y del Brasil, que dedicaremos nuestro más sincero esfuerzo a traducir con exactitud la versión inglesa y a presentar, de acuerdo con los medios a nuestro alcance, una revista autoritativa, informativa, interesante e instructiva.

La Redacción

EDIÇÃO BRASILEIRA

Com o número do mês passado, o de Abril, a Escola de Comando e Estado Maior estendeu seus horizontes com a publicação da MILITARY REVIEW em três idiomas, o português, o espanhol e o inglês.

Os artigos publicados nas edições brasileira e hispano-americana aparecerão tambem na edição em inglês do mesmo mês.

Êste aviso tem em vista dar conhecimento dêste fato aos nossos leitores e assegurar aos nossos vizinhos brasileiros e hispano-americanos que serão envidados sinceros esforços na tradução do inglês, para apresentar-lhes com os meios ao nosso alcance, uma revista fidedigna, informativa, interessante e instrutiva.

A Redação

VOLUME XXV MAY 1945 NUMBER 2

MILITARY REVIEW

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THE COMMAND AND GENERAL STAFF SCHOOL MILITARY REVIEW — Published monthly by the Command and General Staff School at Fort Leavenworth, Kansas. Entered as second-class matter August 31, 1934, at the Post Office at Fort Leavenworth, Kansas, under the Act of March 3, 1879. Subscription rates: $3.00 (U. S. currency) per year for 12 issues. Commencing with this issue, no extra charge for foreign postage on new or renewal subscriptions.

Preparation for a Division Amphibious Operation

This digest was prepared at the Command and General Staff School from notes furnished by Major General A. V. Arnold, commanding the Seventh Infantry Division.—THE EDITOR.

TWO basic factors determine most decisions in the planning of any amphibious operation for the period prior to the time when the division has been established ashore and has initiated normal functioning for land warfare. These basic factors are the target itself and the available shipping.

Once the target has been designated, it must first be determined what attachments should be made to the division to enable it to accomplish the assigned mission. The following are some of the factors to be considered in this connection:

Shore-party engineer troops required to handle the estimated tonnage of supplies and equipment to be landed over the beach, in view of the conditions expected to prevail on the beaches.

Communication personnel and equipment required to maintain communication within the reinforced division and with the Navy, both for tactical and supply purposes.

Any requirements in amphibious vehicles such as tractors and tanks.

Antiaircraft protection needed.

Road building to be required.

Units to meet the needs of special tactical and supply problems; such units may include tank battalions, chemical weapons companies, military police, war dogs, and service elements.

When the complement of reinforcing troops has been set by higher authority, a special table of equipment for each unit of the reinforced division must be adopted. This is true because the shipping space will normally dictate reductions in existing T/E. The initial special table of equipment established for each unit will normally represent what is felt to be the basic minimum requirement to enable the unit to function efficiently in the accomplishment of its assigned mission. Then follows a series of compromises.

These compromises will be adopted as solutions of unavoidable particular problems. For example, the number of vehicles allotted to an antiaircraft battalion may have to be drastically reduced because of the need to operate a tank battalion at practically full T/E strength. The decision in such a case is made after weighing the relative value of tanks as compared to the necessity for antiaircraft protection.

Again, the shore-party engineers may require large numbers of bulldozers to meet anticipated difficulties in landing supplies. Accordingly, another unit will have to receive a reduced allocation to permit making these special vehicles available to the engineers.

So it is obvious that G-3 and G-4 must confer continuously to make recommendations on these changes so as to ensure that the division will be logistically as well as tactically capable of carrying out its assigned mission.

The type of special weapons to be adopted for the operation presents other problems that have to be studied and presented for decision. For example, it might be decided that the 37-mm antitank gun will be substituted for the 57-mm antitank gun, because intelligence indicates that the former will readily stop the hostile tanks that are likely to be encountered.

The type of ammunition to be carried and the number of units of fire for each weapon will also pose problems to be solved.

When decisions have been reached as to what is to be loaded, the priority of unloading equipment from the ships becomes the main consideration. Ships will be loaded, in principle, in the reverse order of unloading. The unloading priorities are properly based on the plan of attack ashore, and should be such as to afford the greatest tactical advantages. Again, this is a matter that results in compromises. For instance, it may be decided to delay the landing of equipment of one unit so that another may go into action earlier in the operation.

The plan for embarkation of troops is closely allied, naturally, to the plan for load-

ing equipment. It has proved advantageous to have troops embarked on the same ships as their assault equipment. Transport Divisions (ships) are usually organized on the basis that each will "lift" a regimental combat team (RCT). A careful study of the characteristics of each Transport Division is required to determine the assignment of RCT's, so that these units will have the greater ease in landing troops and equipment.

This problem is complicated by the fact that, in addition to the assigned RCT, troops under division control (Special Troops and attached troops) are frequently embarked on a Transport Division. In such cases, the priority of unloading for the RCT must be coordinated with that for these other troops.

In adopting these loading plans, the closest coordination is needed with the Navy, in order to ensure execution of the desired priorities for unloading. Many conferences are required to work out details.

Two other major problems requiring joint planning are the Naval Gunfire and Air Support Plans. Particularly for the initial stages of the operation when all fires are prearranged, intensive study is required in which the tactical plan ashore and the anticipated rate of advance inland must be given the closest consideration prior to the adoption of a plan.

Training is complicated by the needs of new units attached to the division during the period of planning. Many of these units may have certain training deficiencies. The division must secure facilities, training areas, ammunition, etc., to correct these deficiencies. Many of these units will function, during the operation, with organic units, and should therefore train with them. Joint training is also required with naval elements. The coordination of these programs, to ensure that the policies and anticipated requirements of these units coincide with the tactical methods of the division, requires the closest supervision. The problem can be appreciated more fully when one considers that for one operation this division may have attached one engineer group, six separate battalions of various types, seven separate companies, and fifteen separate detachments of less-than-company strength.

Steps to Be Taken by G-1

Some of the important measures to be taken by G-1 in preparation for an amphibious operation will pertain to (1) routine personnel procedures, (2) the embarkation plan, (3) civil affairs, (4) passenger lists, and (5) casualties.

G-1 will have reclassification made of all personnel physically or otherwise unfit for combat who cannot be used in any useful capacity within the division. He should obtain replacements for all contemplated losses at least two months before embarkation, to permit training them for the contemplated operation. Personnel necessarily left in hospital should be transferred to the appropriate replacement depot on departure of the division and, on release from hospital, should be included in the earliest replacements for the division.

G-1 should maintain frequent contact with all units of the reinforced division to determine combat efficiency as to physical condition and morale. He should make recommendations to the Commanding General for appropriate corrective measures. Through the Special Services Officer, he should make maximum facilities available to troops for recreation prior to embarkation. He should also secure all available supplies needed for immediate rehabilitation following combat.

After tactical groupings have been made and shipping assigned, G-1 prepares the embarkation plan for loading all troops. It must fit the tactical plan. Closest coordination is necessary with the Division Transport Quartermaster (the officer responsible for planning and supervising the loading and unloading) to ensure that troops and their equipment are, so far as practicable, loaded on the same ship. Troops not needed in the initial phases of combat may be distributed through the assault shipping so as to provide a ship's unloading platoon for each ship carrying supplies.

G-1, through the Division Judge Advocate, should prepare a sound plan for proper hand-

ling of civil affairs. He should also provide for thorough indoctrination of all troops as to this plan, and should issue necessary instructions to all troops as to their conduct and relationship with civilians.

The Adjutant General, under G-1 supervision, should have the Commanding Officer of troops aboard each ship prepare a sufficient number of passenger lists to make the distribution required by higher headquarters.

Through the Division Quartermaster, G-1 should make plans for evacuation and burial of our own and enemy dead. Sites for cemeteries should be tentatively selected, and a Summary Court Officer should be appointed to handle the effects of deceased persons. All personnel concerned with handling the dead should be thoroughly trained, prior to embarkation, to ensure proper sanitation, evacuation, burial, graves registration, and handling of effects.

G-4 Procedures

The general procedures outlined in FM 31-5, "Landing Operations on Hostile Shores," require the development of operational methods and techniques of application. As a result of operations at Attu, Kiska, and Kwajalein, certain solutions of these problems have been worked out, and the resulting techniques have been adapted to specific missions and situations when necessary.

A basic fact as to supply of amphibious operations in this theater is that the landing force must be self-sufficient and self-contained. All necessary troops, equipment, and supplies for the mission must be on hand *and available* at the target area. Major changes cannot be made after ship loading has started. All plans must be completed prior to that time.

The G-4 and allied Special Staff Sections require modification and reinforcement because of the tremendous planning and procurement task. Additions to T/O strength can be made by placing certain personnel on Special Duty with the G-4 Section. For one of this Division's important operations, G-4 was organized into sections for (1) war plans, (2) procurement, (3) palletizing and regulating, (4) liaison with higher authority as to supply, (5) clerical work, and (6) records. In addition to maintenance and supply, the Ordnance Officer conducted a school for DUKW's and LVT's (amphibious trucks and tractors). The Engineer, in addition to sections for supply and combat training, had one for palletizing supplies and one for Shore Party training. The Transport Quartermaster Section was added to the staff by the detail of Special Duty personnel (one major, one captain, and one clerk). The Quartermaster had a Plans Office and an Operations Office; the Surgeon an office for evacuation and one for supply; and the Signal Officer an Operations Office and a Supply Office. The Chemical Section was combined with Ordnance for supply during combat.

Orderly planning requires a step-by-step development. A planning schedule, providing a check-list of projects, has been developed. It is a guide and an ideal to be striven for.* As the various organizations (Army and Navy) become more proficient, some of the time elements can be reduced. The most important single factor contributing to speed of effective action in such an operation is, aside from experience and training, the cooperation and mutual understanding of all concerned.

Methodical development of supply plans calls, firstly, for a determination of requirements. Modifications in Tables of Equipment, already mentioned, should be based on actual needs, and a list of equipment, carefully checked both by supply and tactical personnel, can well be made up under the following headings:

1. Equipment common to all amphibious operations. Quantity *not dependent* upon mission.
2. Equipment common to all amphibious operations. Quantity *dependent* upon missions.
3. Equipment for specific missions.

In the Pacific, the task of estimating shipping requirements for a reinforced infantry division has been complicated by the fact that

* For a basis for such a schedule, see FM 31-5, page 26.—Editor.

many APA's (assault transports for personnel) are small and are so constructed with trunk hatches and compartmented holds that their capacity is limited. This handicap has been overcome by using additional landing ships, the LST (landing ship, tank) and LSD (landing ship, dock). (These are small ships, or large nonshipborne landing craft, with ramps.)

A Transport Division has normally consisted of four APA's (a type already mentioned) and one AKA (assault cargo ship). Three transport divisions have been usually provided for a reinforced infantry division. LST's and LSD's are utilized for amphibious vehicles (tractors and DUKW's *) and for tanks. Most LST's carry pontoon-causeway material or LCT's loaded on the weather deck. (The LCT is a landing craft, tank, with ramp, capable of carrying several such vehicles.)

The critical articles in loading ships are vehicles, heavy engineer equipment, and palletized cargo.

The Division has developed a Transport Quartermaster SOP. In addition, the Division Transport Quartermaster (TQM) has collected and maintains a file of ship characteristics and other data on all ships in the amphibious forces of the Pacific. This file enables the Division to make preliminary plans as soon as tentative ship assignments have been made.

Advised by the TQM, G-4 prepares a general cargo assignment in terms of days of supply and units of fire according to types of ships. Then the Special Staff Sections concerned, with the assistance of the TQM, make up detailed cargo assignment forms for the guidance of the ships' TQM's. Each unit has its own Personnel and Tonnage Table as a basis for loading. By the use of this table and the detailed cargo assignment forms, the ship TQM's make their individual loading plans. Adjustments are made by the Division TQM, with the approval of G-4. While loading is supervised by the TQM's, it is a command responsibility. Execution is decentralized to the several unit TQM's. They attend the Division TQM School, and they and their assistants supervise the loading of the ships to which their units are assigned. This loading, of course, pertains to the troops and their equipment and supplies allocated according to available troop space. The TQM has no responsibility for loading of the ship's crew or ship supplies in (reserved) ship space.

The practice as to palletizing has been to utilize four- by six-foot sled pallets, loaded with supplies to facilitate unloading and to assist Shore Party operations (i.e., handling of supplies over the beach). Palletized supplies reduce the amount of labor required on the beach by as much as seventy-five percent. This procedure also speeds up the unloading of landing craft and the segregation of supplies in the dumps. Experience has shown that the time and labor saved, during early critical stages of the landing, justifies the use of palletized cargo in spite of the fact that there may be a sacrifice of cargo space.

Control or coordination is necessary as to the movement of supplies and equipment from branch supply depots by way of the Palletizing and Transshipment Area to the troop bivouac areas or piers for loading. This control is accomplished by the Regulating Section of G-4's office. The principles outlined in FM 100-10, paragraphs 85-102, are applicable, except that a Division Regulating Officer must work through other agencies to obtain necessary transportation. Control is facilitated by liaison officers at the various depots, and is furthered by concentrating forty to fifty percent of the supplies in the Division Palletizing and Transshipment Area. Assistant Regulating Officers coordinate the movement of supplies in accordance with schedules for delivery to piers. Deliveries are checked for completeness, correctness, and proper lot number (ammunition). Periodic reports are made to the Regulating Officer on the number of truck loads or rail-car loads dispatched, the destination, and the amount of supplies. On shipments by rail, report is made of car numbers, destination, type and amount of supplies, and the estimated time of arrival.

The system developed for the initial ship-

* The DUKW is the 2½-ton amphibious truck.—Editor.

to-shore movement of supplies is interrelated to the control system and the communications system, the whole procedure being dependent on the approval, compliance, and cooperation of the naval forces involved.

Essentially, the ship-to-shore supply system developed by this Division for the close support of the initial land combat phase provides rapid delivery of supplies to combat troops ashore, by the use of LST's and DUKW's before the Shore Party starts functioning. Neither coral reefs nor lack of an adequate beachhead prohibit this method of supply. Armored LVT's (amphibious tractors) can be substituted for DUKW's if the distance to be traveled on land is not too great. LST's are used as a floating supply dump. They are stocked with approximately two days of supply of selected items, such as rations, water, fuel, cleaning and preserving materials, QM expendables, and one or two units of fire. Such supplies, requiring a lift of eight or ten LST's, are adequate for a reinforced division. DUKW's carried on supply LST's should be preloaded with selected articles most urgently needed for initial resupply.

The division artillery, with 105-mm howitzers loaded in DUKW's embarked in LST's can be self-sufficient. Rations, water, fuel, cleaning and preserving materials, expendables, and ammunition can be loaded with the troops. One LST is adequate for one battalion of 105-mm howitzers loaded in DUKW's, seven units of fire, other supplies, and essential personnel. Only a very few of the organic vehicles can be carried on the artillery LST. However, for operations on small islands, only a few general-purpose vehicles are required, as the DUKW's can function as prime movers and as ammunition and supply vehicles. On larger land masses, additional general-purpose vehicles are required.

Control of Ship-to-Shore Movement

Adequate and continuous control is essential to the proper movement of supplies to the beach. To accomplish this, details must be worked out with the naval personnel concerned (Commander Attack Force and Commander Transport Group, and their staffs). Speed in unloading, while important, should be no greater than the speed with which supplies can be moved across the beach and into inland dumps. Because the beaches are generally small, they easily become crowded, and if supplies pile up, they interfere with efficient operation and are subject to pillaging or to damage and destruction by enemy action.

Control of the ship-to-shore movement is vested in control parties. Such parties must have a complete, detailed record of the kind, amount, and location of all supplies embarked. Records must be kept of the supplies unloaded from the various ships. There are two phases in the control of supply-unloading.

Phase 1 is the initial resupply. For control of this phase, a Control Party Afloat is embarked in a Navy Control Boat with radio communication. This party receives requisitions for supplies and determines which ship can furnish the required amounts. This decision is based on supplies aboard ships, their accessibility, and the type of landing craft available. The principal purpose of this initial resupply Control Party is to handle the LST-DUKW system and initiate the Shore Party Phase.

Phase 2 occurs when the Shore Party is ashore and functioning. When a normal land supply system can be operated efficiently, the control shifts from the Control Party Afloat to the Control Party Ashore.

The two Control Parties are separate. The order relieving Control Afloat and transferring responsibility to Control Ashore is given by G-4.

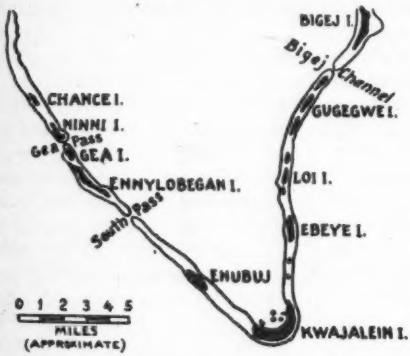
The Army Control Party Afloat, embarked with the (Naval) Beachmaster and Beach Party on a Navy Control Boat, consists of the Assistant G-4's, certain clerks, and the Division Surgeon. They operate under G-4 control, in cooperation with the Beach Party, which operates under the control of the Transport Group Commander. The Division TQM is the direct link between the last-named and G-4.

For Phase 2, the Army Control Party Ashore consists of the Assistant Division

TQM's, who deal with the Division Shore Party Commander (the Commanding Officer of the Engineer Regiment which performs Shore Party duties) and the Beachmaster. The latter remains under the control of the Transport Group Commander, who, with the Division TQM, is of course still afloat.

G-3 Planning

The necessary flexibility in G-3's plans may be illustrated by the Kwajalein operation. Initial plans for operations in the Marshall Islands (Kwajalein Atoll being located there-



Southeastern portion of Kwajalein Atoll

in) were made prior to the assault on the Gilbert Islands. Very little was known about the Marshall Group. The best defended atolls were believed to be Jaluit, Mili, Maloelap, and Wotje. Kwajalein was regarded as of prime importance because of the known desirable features of its lagoon for a fleet anchorage. However, it was felt that Wotje and Maloelap must be taken as the first phase. Our Division was to make the assault in this first phase, while the Marines were to deal with Kwajalein, later. In the partial plans prepared at this stage, it was decided that in each case the assault should be made from within the lagoon after a preliminary phase which involved taking a neighboring island and mounting it with division artillery.

However, as the strength of these bastions became more apparent, our Division was restricted to the assault of Maloelap, the Marines to take Wotje, while both would later assault Kwajalein. But here, again, conditions called for a change in plans. The difficulties encountered in the Gilberts, at Tarawa, changed the conception of the Marshall plans. It was then realized that a larger number of troops than was available would be required to take the better defended atolls of the Marshalls. The decision therefore was to bypass Wotje and Maloelap and to concentrate the entire force on Kwajalein—the Marines to take the northern half of the atoll with the air base at Roi and Namur, while our Division was to take the lower half (see sketch)—some twenty-one islands, including Kwajalein Island which was known to be the headquarters for the entire Marshall and Gilbert area. How plans were developed for the attack on this island will be described later.

G-2 Operations

No maps were available throughout the Mandated Islands, and charts gave only relative positions of the coral islands or the reefs and only a general outline of the main islands. Such "outline" charts had been prepared from long oblique photographs taken during the carrier strike of early 1942. Before detailed plans could be prepared, it was essential that hydrographic conditions be determined, as well as the degree of difficulty facing our attempt to land across the reef.

After the preliminary carrier strikes prior to the Gilbert operations, photographs became available of Taroa Island (of Maloelap Atoll), and interpretation showed a maze of defensive positions and obstacles of all kinds. On this basis a detailed plan for assault of Taroa was worked out, calling for a preliminary seizure of an isle a few thousand yards to the south and the mounting of artillery theron on D minus 1; on D-day, Taroa was to be assaulted from the lagoon side, with two regiments abreast. From the photo-interpretation maps issued by Joint Intelligence, operational plans were prepared at Division Headquarters. All distinguishable physical features were named, and defensive positions numbered, while an artillery plan was drawn up based on a priority of targets as requested by G-2.

When the objective shifted to Kwajalein Atoll, this effort was not lost. Much the same procedure was repeated for the new plan. The first photographs secured of the atoll failed to cover Kwajalein Island. However, a map was prepared from obliques, which gave the main island a width of 1,600 yards and a length of five miles, and showed it to be curved. It was believed that the lee side had a low surf on the reef. Of the two neighboring islands, Ennylobegan and Enubuj, the one 6,000 yards northwest of Kwajalein Island was ideally suited to support the assault on any beach, particularly as to the west end.

Less than two weeks before departure date, complete photo coverage revealed the island to be one half the size that had been assumed. In addition, defenses were found to be about double the earlier estimates. The Division was permitted to name and number all points on the island, and the completed maps showed all those details plus known enemy defenses. These maps, on the scale of 1/3,000, were distributed down to and including squad leaders.

This late intelligence, fortunately, did not require a change in plan, but it illustrates what may occur when there is almost complete absence of vital information during the early planning phase. The required intelligence was secured only after all agencies of higher headquarters, both Army and Navy, had shifted their emphasis from the Gilberts to the Marshalls.

Had the Intelligence Section depended upon issue of information through channels, proper planning would have been impossible. Each headquarters was so concerned about the information necessary for its own section that lower echelons were bound to be of secondary importance. In addition, the routine military communications were far too slow. This situation was met by constant liaison directly with all agencies—Joint Intelligence, Naval Intelligence, Amphibious Corps Headquarters, Submarine Reconnaissance Section, Air Corps Intelligence, Photo-Interpretation Headquarters, Map Reproduction Plants—all of which furnished spot information without usual formalities that would have involved a long period of transmission. By close contact, it could be known when a single print of photos had just arrived at higher headquarters, and means could be found to secure the use of the photos for a few hours during the night, so as to determine whether they met any of the needs of the ground forces.

In one instance, a plan for assault on an atoll was ordered to be presented in forty-eight hours, no maps being available. The Intelligence Section then had to produce maps based on obscure oblique photos and on meager descriptive material. However, when proper maps were later secured, the changes required were found to be of a minor character.

While the main assault was being made on Kwajalein Island, the action was closely followed by G-2, and attention was focused on the *next island* to be attacked. By interpretation of recent photographs, by compilations of reports of air reconnaissance, and by other miscellaneous intelligence, it was possible to secure an accurate estimate of the garrison and the location of guns and strongest defenses, and even to learn the contents and purpose of each building on the island. This information reached the units involved in the respective assaults in time to be of maximum value.

Experience has shown the need for certain specific procedures to be established by G-2 in preparing for such operations. There must be an energetic follow-up of requests for aerial photographs, or the photographs, when obtained, may not reach the Division. Close liaison, direct with the operations section of the Air Force concerned, must be maintained by the major ground unit making the request.

With the many correspondents assigned, the Division must have a Public Relations Section, even though there is no T/O provision. Therefore, as it is imperative that true factual accounts should be produced for the Press, there must be thorough briefing, also the issue of objective material (including maps) for study, and assistance in obtaining news accounts of the various units. Reporters must be housed and cared for and, most important of all, their copy promptly evacuated.

The censorship procedure prescribed by the Theater Command should be carefully studied and, where general restrictions are unnecessary for a specific operation, permission should be obtained to remove them. The essential measures should be strictly enforced. Cooperation in the matter of censorship is a difficult problem at best, and is more easily obtained when needless restrictions are not imposed.

A thoroughgoing procedure is, of course, necessary for operating the language team and the handling of documents, as also for the Counterintelligence Corps Detachment.

As soon as security restrictions permit, frequent meetings should be held of all division intelligence personnel, officers and key enlisted men of regimental, battalion, and company echelons (assigned and attached) being included—Intelligence and Reconnaissance Platoons, Reconnaissance Troop, Division Artillery, and the Signal Company. All elements must be made thoroughly familiar with their parts in the Intelligence Plan. By becoming acquainted with other personnel and their problems, each intelligence group is better prepared to assist in the all-important lateral transmission of information between lower units. Emphasis is placed on the importance of combat intelligence secured from units in contact, and on the fact that other agencies such as air photos and air reconnaissance are only supplementary. Each battalion S-2 must so organize his intelligence system that every man in the front line is instantly aware of the importance of instant reporting of facts. In addition, stress is laid on the close contact with division artillery elements for information secured by their observation personnel.

The Kwajalein Operation

For the landing assault on Kwajalein Island (see sketch), the planning concept was that this small island was in effect a fortified position, ringed by a moat (reef) and surrounded by an area affording unlimited fields of fire. Two plans had to be considered—landing from the lagoon side and landing over the reef from the sea side. Available photos showed the usual strong beach positions with antitank obstacles, concrete pillboxes, and blockhouses. This situation led to a decision to place all the offensive power on a narrow front, concentrate our destructive force on this narrow sector, break into the position, and take the individual strongpoints by enveloping action.

From the lagoon side, the assaulting force would be subjected to converging fire from the whole lagoon beach, but a landing from the outer side on the end (the western tip of the island) would eliminate direct fire from all positions except those on the end beach. The preliminary plan was accordingly submitted to higher headquarters for a landing, two regiments abreast, on the west end of the island, supported by division artillery emplaced on the nearby island to the north. This plan was approved with the provision that operations be included for the preceding day, to secure the two small islands Gea and Ninni guarding the lagoon, and that alternate plans be prepared for a lagoon landing if the sea became too rough.

Editor's Note

The success of the preparations made for the assault on Kwajalein Atoll is now a matter of history. (For a detailed account based on interviews with participants, see *Island Victory*, by Lieutenant Colonel S. L. A. Marshall, published by the *Infantry Journal*.) After an uneventful cruise from Pearl Harbor covered by a series of air bombardments against the far-flung Japanese island chain, the 7th Infantry Division initiated landing operations on 31 January 1944. First, assisted by air strikes and surface bombardments, the Division captured the entrance islands by the use of its Reconnaissance Troop. On the same day, Enubuj and Ennylobegan were seized by two battalion landing teams told off for the purpose. Artillery was promptly emplaced to support the attack on Kwajalein Island.

On 1 February, Kwajalein Island, after a thorough beach reconnaissance under gunfire support, was assaulted at its western end by

two regimental combat teams. With the assistance of intense air, gun, and artillery support, despite desperate fighting in a tangled mass of wrecked dugouts, trenches, pillboxes, and thick tropical vegetation, the island was secured on 4 February.

In the period 3 to 5 February, the islands of the eastern chain were secured by the remaining regimental combat team and the Reconnaissance Troop.

On 5 February the remaining islands of the western chain were cleaned out, and reembarkation began.

The operation was expertly conducted with complete success and relatively small loss, notwithstanding the fight to the death put up by the strong garrison. This success is, of course, to be largely attributed to the careful preparation which had been made during the planning phase.

The People's Grenadiers

Translated at the Command and General Staff School from a German article by War Reporter Martin Krieger in *Deutsche Allgemeine Zeitung* 5 November 1944.

THE accomplishments of the People's Grenadier (*Volksgrenadier*) Divisions that have appeared so far on the various fronts have been quite satisfactory. Organization and equipment of units must continually change in accordance with tactical and technical developments. While such changes usually take place over long periods of time only, the People's Grenadier Divisions represent an unusually sudden reaction to the experiences of the past year; in truth, of the last months of this year [1944].

The men constituting them no longer come from certain German districts but from the entire German nation. Soldiers who have convalesced and soldiers who have been released from other duties form the blackbone of the forces. These "old hands" bring with them a considerable fund of fighting experience.

In training, extraneous matters that are of no consequence in combat or to fighting spirit are intentionally disregarded. The weeks spent in preparation serve solely for teaching the men how to fight. Exercises in the formations give a near-real aspect to both technical and personal training, and actual battle completes the work.

In the commitment of the human material, the fighting forces are given first attention. The heavy equipment of the Grenadier units with the latest of automatic weapons marks a skilful move against the tactics of our enemies who break down the resistance of our infantry by the commitment of matériel alone, without losses on their own part. A front line armed principally with machine guns and protected by the fire of heavy weapons, powerful assault reserves in the depth of the field of combat, copious equipment with means for the close combat of tanks, material increase in strength of antitank guns, and the employment of all heavier weapons, especially of artillery in antitank defense, assault guns, and antitank guns—with this the People's Grenadier Divisions reply to the frequently-asked question, "What have we with which to oppose the enemy's tactics?"

We learned to distinguish between what was necessary and what was agreeable. The requirements of this knowledge we meet in the form of the People's Grenadier Divisions. A revolutionary shift from the conventional, conscious withdrawal from all that is of a bureaucratic nature, cancellation of the concept "impossible," and the manly recognition of the deadly danger of these weeks determined the existence of the People's Grenadier Divisions. They are the guarantee that very soon many divisions which at the present time are being organized or trained will appear successfully at the front.

The Troop Carrier Command

MAJOR JOHN N. MCVAY, *Air Corps*
Instructor, Command and General Staff School

THE Troop Carrier Command is at long last recognized as one of the mightiest fighting units in the Army Air Force organization. For a long time every interested soldier or civilian who looked skyward and saw an Army C-47 either remarked or thought, "Gee, those guys are lucky—flying all over the world in a transport airplane and building up valuable transport time for airline flying after the war. I wish I were in the ATC." Yes, the Troop Carrier Command was confused with the Air Transport Command for many months. Few people, including military personnel, realized that the Troop Carrier Command had been assigned a combat mission. Even Air Force people in the combat theaters failed to appreciate that the big C-47's which brought the mail to their airdromes were being prepared to fly behind enemy lines, to get shot at, and encounter all dangers of ordinary combat aircraft. Their cargo, however, was not to be ordinary. They would be carrying a very fragile and expensive bomb load, namely, airborne soldiers to drop behind enemy lines.

The men of the Troop Carrier Command went about their job silently and efficiently, getting very little notice from the rest of the bomber and fighter men. One morning, in July 1943, we were surprised to hear that these men, who were "getting valuable transport time," had dropped the 82d Airborne Division in Sicily.

The aftermath of this episode in Sicily was startling. The mission, as far as Troop Carrier was concerned, left much to be desired. Rumors circulated around the world as to what went wrong. Newspapers added some comments, but none of these comments or rumors would help improve this type warfare. It remained for the Troop Carrier commanders and the Army Air Force to list the mistakes made and start from scratch in the solution of each and every one.

The men "in the know" realized that from the time the loading of airplanes and gliders was completed until the parachutists were dropped and the gliders landed that it was a Troop Carrier operation, and that the Troop Carrier Command and the Army Air Force must take positive steps in assuring the success of future missions.

What, then, were a few of the important changes and new devices which had to be worked out to improve the air phase of this type operation? Let us list a few of these and see just what improvements and experiments were made.

1. Training, of course, had to be changed in order to assure Troop Carrier commanders that each crew, of both airplane and glider, knew what to do and what not to do. Rapid take-off and landing procedures had to be perfected, flight formations standardized, experience in day and night operations given each crew, use of navigational aids perfected, and many other details pertaining to the actual drop practiced with the airborne soldiers.

2. Because our navigation had to be perfect, it was necessary to devise every possible aid, both radio and visual, to use on our missions. The Troop Carrier navigator must have every available aid for use in case one or another is not working properly. Because Troop Carrier missions are usually flown at low altitudes and many times under the cover of darkness, it has become necessary to arrange navigational aids along the flight path, to use pathfinder aircraft, and also to have visual aids at the drop and landing zones. The use of vessels in the form of submarines, destroyers, and motor launches with radio beams and visual signals is standard procedure on the recent operations necessitating over-water flights.

Pathfinder aircraft have been used in the form of bomber-type planes, but more recently the regular C-47 has been used and Troop Carrier is training crews to operate pathfinding equipment in these C-47's. This equipment allows the crews of the ships to find their way to the drop zones.

The critical area for the Troop Carrier

planes is that last twenty miles to the drop zone. Since our C-47's must fly directly over this "meadow," it is necessary that a last-minute check be made to ascertain the accuracy of the navigation. Many other navigational aids are ready for use in addition to those mentioned. The difficulty with visual signals is that enemy fire may be drawn. It is said that the IX Troop Carrier Command had seven different aids to use in the Normandy operation, and this excludes vessels which were used in the Channel.

3. Troop Carrier learned from their earliest operation that accurate weather information must be available. Not only must the information concerning the weather be accurate and available on the day of the drop of the airborne soldiers, but it must be likewise forecast for several days afterward, in order that supplies can be delivered to these airborne soldiers on the ground behind enemy lines. Three or four days of good weather must be in the offing in order to assure success on these operations.

4. Troop Carrier-Airborne operations are vital missions and often accompany a large-scale amphibious operation. With many naval vessels and armed transports spread out in the vicinity of the landing beaches, it is impossible on many occasions to prevent this large air convoy from flying over the vessels. The air over the convoy must be kept as clear of aircraft as is possible in order to prevent enemy planes from sneaking into positions for an attack on the vessels. It has been proved that, by proper coordination with the Navy, a corridor may be established through which these Troop Carrier formations may pass with safety. In addition to the corridor being established, navigational aids on the vessels below can be set up to guide the C-47's through the corridor. The Navy must know the number of planes, their altitude, the time they will be over the convoy, and how long the formation will be. Steps must be taken to assure the safety of these aircraft, as improper coordination may result in disaster.

5. When two forces are working together as closely as are these two forces, Troop Carrier and Airborne, it is necessary that each knows the plans of the other and that complete cooperation exists in formulating the plan for the drop of the airborne soldiers. Experience has proved that these participating forces can work together and formulate a workable plan. Once each of these two commands gets its own plan of operation complete, their commanders meet and complete the plan which covers those phases of the operation important to both.

6. Both Troop Carrier and Airborne forces are trained to operate at night. Missions can be and have been completed under the cover of darkness. When night operations take place, it is desirable to have at least a quarter moon. This amount of light may mean the difference between success and failure. When flying night missions it is unnecessary to have fighter protection, but on the other hand navigation is more difficult and radio aids must be available to assure perfect navigation.

Daylight missions are preferred by both Troop Carrier and Airborne forces. It was first believed that losses of aircraft and personnel during daylight operations would be very heavy, and that night missions would be best. We have learned, however, that daytime losses due to enemy action are balanced by the losses encountered at night through accidents caused by darkness making the landing of gliders very difficult. We must have available during the daylight hours adequate fighter cover and escort, as these C-47's are vulnerable to enemy air attack. Without fighter cover a daylight mission may be completely disorganized by attacks from one flight of enemy airplanes. It is important, therefore, that all units of the Air Force be coordinated with Troop Carrier missions.

7. We have discussed many of the important planning and training phases of these Troop Carrier-Airborne operations. Now, what must we have in the way of information that will enable Troop Carrier commanders to decide on flight routes and drop zones? It would be folly for Troop Carrier to attempt to drop these airborne forces into an area which is strongly defended by enemy

troops or antiaircraft artillery. It would also be wrong to have drop and landing zones in terrain that prevented these low-flying formations from making a smooth approach suitable for the drop.

Our intelligence, therefore, must be able to inform us as to enemy troop concentrations and positions in and around the drop and landing zones. We must also know where other enemy units are located, and how soon they can get to our landing areas. Intelligence concerning the location of antiaircraft artillery along the route and at the landing zones must be accurate in order that our flight route will avoid as much of this as possible.

Pictures of the area around the drop zones will be of great value from the identification aspect, and both vertical and oblique coverage will be required by the two forces involved.

Sand-table briefing will pay off, as low-flying crews will be able to fix in their minds exact check points. Airborne forces use sand tables built to show enemy emplacements and forces down to and including the platoon. Troop Carrier will also need this exact study for briefing purposes.

On one operation, reconnaissance pictures revealed that glider obstacles had been set up in the chosen drop and landing zones between D minus 5 and D minus 2. Constant coverage will be necessary to assure Troop Carrier that no obstacles or mines are put on these selected zones between the selection of them and the actual drop.

8. On completion of the plans which include all the items we have covered, and in particular operations many more, there is a detailed plan left to be made out. This plan is an all-inclusive one of the exact movements of each unit, worked out to include loadings, take-offs, time over targets, drop times, and many other steps in the actual operation. This table, called an Air Movement Table, is the exact plan of Troop Carrier's activity in moving the airborne units, piece by piece, to the drop zones.

Lessons concerning intelligence, navigational aids, coordination with the naval and airborne forces, fighter protection, weather, and a myriad of other problems of planning were learned from our first Sicilian operation. In each succeeding operation, success has been increasingly apparent.

Recent Troop Carrier successes have made history. The New Guinea operation resulting in the capture of Lae was not on a large scale but was successful. After this operation, the Troop Carrier forces in the Mediterranean Theater of Operations were called in to transport some parachutists to Italy and drop them five miles behind our lines to reinforce infantry units in action. While this was not a battle test, it gave our forces experience in setting up navigational aids on vessels. Also, the success obtained in putting these men down in the right places instilled the feeling in the crews that if we can do it here, we can do it behind enemy lines.

After this operation in Italy, things were quite slack as far as the primary mission for Troop Carrier was concerned. June 6, 1944, broke the silence with a "loud bang." On this historic morning the IX Troop Carrier Command dropped the 82d and 101st Airborne Divisions into France. We had plans for this operation which corrected those many mistakes made in the Sicilian operation. It was a great success.

Not resting on the laurels gained in Normandy, our boys flew from England to Italy, and after a short training period dropped 9,000 airborne soldiers into southern France with the loss of only two gliders. In these two gliders only one man was killed. This operation was extremely successful, as we had put our "fragile and expensive" cargo where we had intended it should go.

Upon the successful completion of this operation our planes were hurried from Italy back to England, where as a part of the First Airborne Army we were to drop other airborne troops into Holland. This daring plan was the culmination of effort in airborne invasions. The IX Troop Carrier Command was extended to the utmost, as each and every available plane was employed fully. Here Troop Carrier flew through flak during daylight, and put their 'chutists and gliders down

into the drop zones and landing zones. Coordination with the other air units was remarkable. Over 4,000 planes participated the first day, and over 3,000 the second. In addition to this, the Troop Carrier men airlanded some British soldiers behind the front lines, right in the face of the enemy on only partially prepared strips and without loss.

In conclusion, I want to point out that while the Troop Carrier Command was busy improving these operations—that is, transporting airborne soldiers and resupplying them—their secondary missions of ferrying troops and supplies, evacuating sick and wounded, and running a combat zone airline were not forgotten. I point this out because I have devoted this article to a discussion of some of the experiments and planning advances made in the accomplishing of the primary mission assigned Troop Carrier.

Much can be said, and will be said in the near future, about the air evacuation of wounded, the emergency supply of isolated units, island hopping, and many other Troop Carrier accomplishments.

The Air Forces and the Ground Forces are justified in saying "Well done" to the Troop Carrier Command.

Remember! When you see a huge C-47, it may not be just an ordinary transport. It may have done more than deliver our mail or carry us to a rest camp. It might have been one of the hundreds which dropped airborne soldiers into Sicily, Italy, Lae, Normandy, southern France, or Holland.

Do not underestimate the Troop Carrier Command. Though their primary missions are not frequent, they are vital and on a large scale, and the planning for them must be excellent. They cannot fly fast and they do not fly high, but they are doing a man-size job.

Allied Antwerp

From a British source.

THE port of Antwerp, which is run jointly by Britain and America with over-all British control, is an excellent example of Allied cooperation. Everyone concerned has a finger in the pie.

The Royal Navy runs the port, while the Americans, Canadians, and British man the defenses. The Port Council, consisting of the British Port Commandant, the American Port Commander, and the Belgian Civilian Port Engineer, includes among others a representative of the Belgian Civilian Stevedores and Longshoremen's Union.

Royal Navy minesweepers, dredgers, and divers work in the channels, and U. S. engineer battalions operate the marshalling yards. There are both British and American longshoremen.

British sappers carried out the heavy repair work to the damaged sluices, bridges, and lock gates, latterly with the help of some American engineers, while scores of trained Belgian civilians who have worked in the port all their lives are adding their efforts.

Thousands of tons of German scrap, which had been loaded by the Germans onto ships bound for Germany, were taken over by the Allies when the port was captured.

"If all the armies in the world were suddenly dropped right here on the continent of Europe we could probably supply them all through this one port of Antwerp." In these words an American general summed up the unique importance to the Allies of the port through which the American, British, Canadian, and French armies in Europe receive most of their supplies. Its great size —perhaps the greatest port of continental Europe—and its strategic position on the Schelde make it a vital clearing house close to the Western Front.

Vectographs and Their Military Role

LIEUTENANT COLONEL CLARENCE A. LANGFORD, *Coast Artillery Corps*
Instructor, Command and General Staff School

THE following was extracted from a recent report by an Army Ground Force observer on duty in the Southwest Pacific:

"Vectographs are issued to task force commanders far enough in advance of an operation to permit their use in planning. Normally, six copies of small-scale vectographs and six copies of large-scale ones covering the beach and vicinity, comprise the initial issue. In approximately fifty percent of the operations, task force commanders request and are furnished additional copies or vectographs of additional areas. Vectographs are always issued."

Just what are these vectographs that seem to be so widely used by task force commanders in the Southwest Pacific, and wherein lies their usefulness? How many commanders know the answers to these questions? Task force commanders, yes, perhaps—but not enough subordinate commanders. If these vectographs were useful solely to task force commanders in the Southwest Pacific an article on the subject for general distribution would hardly be worth while. It so happens, however, that they are useful to all commanders—down to and including platoon leaders, and in all theaters.

The word "vectograph" isn't to be found in the dictionary. Furthermore, it isn't listed in the new WD TM 20-205, *Dictionary of United States Army Terms*, nor in any of the other War Department publications that the subordinate commander is likely to run across. Well, what are they? They are simply three dimensional pictures in the form of single prints. Every officer in our Army today is acquainted, to a degree at least, with the use of the stereoscope to get three-dimensional effect from a stereopair of aerial photos. The stereoscopic principle is certainly not new. Our armed forces used stereoscopes in the World War to study enemy terrain. The only new wrinkle that the vectograph process offers is that the three dimensional effect is gotten from a single print which can be reproduced in mass quantities, and which can be viewed by more than one person at a time.

The process by which three-dimensional vectographs are made is simple. You start with an ordinary pair of stereoscopic negatives obtained by any of the usual methods. These are printed on wash-off relief film by much the same process as any other negative is printed. The two reliefs, still wet, with their relief surfaces face to face, are hinged together with a piece of tape and soaked briefly in a printing solution. Next, a sheet of special vectograph film is inserted and the "sandwich" made of the one sheet of vectograph film between the two relief films is run through an ordinary clothes wringer. In less than a minute after emerging from the wringer the images are complete, one on one side of the vectograph film and one on the other. The relief films can then be stripped off and set back to soak for the next print. After the vectograph has been washed and fixed, the front surface is painted with clear lacquer and the back surface with aluminum lacquer, and the vectograph is ready for use. As many as two thousand vectographs can be made from the same set of relief films. To turn out the first of the prints requires twenty to thirty minutes, but succeeding prints require only about one man-minute apiece.

The finished vectograph print resulting from the above operation, if viewed with the naked eye, has the hazy appearance of a double exposure. If, however, it is viewed through special spectacles or expendable paper viewers, the print takes on a third dimension—depth. The terrain seems to spring to life. Hills, valleys, vegetation, and other features of tactical importance appear exactly as they would in a photographically accurate model of the particular terrain. The model is right there before you, depicted with all the accuracy and completeness of detail necessary to permit full utilization of the terrain in any proposed military operations over the area covered. Defiladed areas can be determined and heights and depths estimated to a fair degree of accuracy by comparing them with

COMMAND AND GENERAL STAFF SCHOOL

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FORT LEAVENWORTH, KANSAS

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Command and General Staff School, Fort Leavenworth, Kansas

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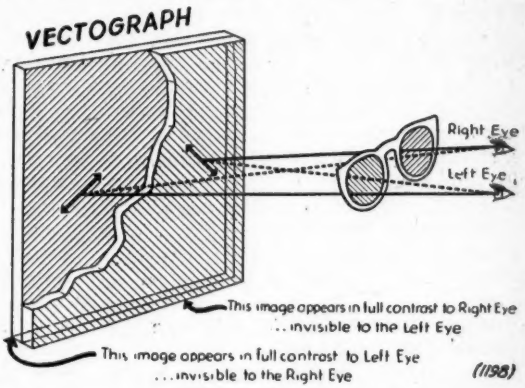
trees, buildings, etc., the approximate heights of which are generally known.

The principle of the vectograph is easily understood. Unlike other pictures, it does not create its image in pigment, dye, or concentrations of silver particles. Its image is created by changing the polarization of the light passing through it. On one side of the vectograph film, the image polarizes light in one direction and the image on the other side polarizes light at right angles to this direction. The spectacles used to view the print have polarized lenses similarly arranged with the axis of polarization of one lens at right angles to that of the other. The result is that through the spectacles one eye sees the image on one surface of the vectograph films and the other eye sees the image on the other side. The overall direction of the polarization determines the particular image that each eye sees. The brain fuses the two images together and the result is a single three-dimensional impression.


VECTOGRAPH
Right Eye
Left Eye
This image appears in full contrast to Right Eye
...invisible to the Left Eye
This image appears in full contrast to Left Eye
...invisible to the Right Eye
(11198)

If it is desired to study, as a whole, a larger section of terrain than can be covered on one vectograph print, the separate views can be pieced together to form a sort of three-dimensional mosaic which can be studied by a group of people at the same time. If an even larger number of persons are interested in the same piece of terrain, a vectograph slide can be made of that particular terrain and the view projected by means of an ordinary lantern-slide projector on a screen. The screen, however, must have a metallic surface—aluminum painted, for instance—in order to preserve the special structure of the light that forms the images.

It is probably apparent by now why these three-dimensional vectographs are issued to task force commanders well in advance of an operation. These pictures have an important use in any military operation where a detailed, accurate study of the terrain is essential. The stereoscope unquestionably remains the best means of obtaining detailed information from aerial photographs for intelligence purposes, but only one person at a time can use the stereoscope and expert manipulation is necessary. The military value of the vectograph lies in the fact that several persons can study the prints at the same time, and any number can view the slides simultaneously—and further, the terrain on these prints or slides appears much more realistic than that same terrain appears on a map or aerial photograph. In other words, their value arises from their use in the role of map supplements and map substitutes rather than from their use in the production of combat intelligence.

Perhaps it is in the preparation of plans for an amphibious operation that these vectographs find their most widespread use. Extensive series were made for use in the invasion of Normandy. It is essential that the staff officers planning the landings as well as the troops executing these plans be completely familiar with the approaches to the landing beaches, the beaches themselves, the beach exits, and the terrain behind the beaches. A very convenient method of obtaining the necessary detailed information is by studying vectographs of the area. In them the folds of the land, the vegetation, buildings, obstacles, etc., will appear in the most realistic form possible—a form that requires no special skill for interpretation and requires a minimum of imagination. Unit commanders can be briefed

in even more detail than is possible from a terrain model. By means of a vectograph slide projected on an aluminum screen the assault troops can be shown how best to take advantage of the terrain in order to minimize losses.

Other military roles of vectographs include their use in:

Briefing air crews on their bombing and strafing targets.

Briefing airborne troops, particularly the glider pilots on the terrain to be used as the glider landing zone.

Disseminating information on bombing results in a visual form to non-experts. (The use of vectographs in the actual assessment of bomb damage is not contemplated.)

Briefing reconnaissance units and raiding parties to insure maximum exploitation of the terrain.

Briefing assault teams charged with the reduction of difficult fortifications.

The presentation of combat intelligence in an easily interpreted visual form to groups of individuals by photo interpreters.

Aiding in the selection of artillery positions by disclosing defiladed areas quickly and with a fair degree of accuracy.

Generally, in all important or difficult operations, in aiding commanders to take every possible advantage of the terrain and vegetation to reduce losses and to carry out their missions with maximum effect.

The supply of these vectographs is now an established service in the Army Air Forces, being a standard product of their photo-request of air or ground officers and secured through the same channels used in the procurement of aerial photos. Until recently, the lack of trained personnel and the necessary processing equipment has limited their use to some extent, but that shortage has now been corrected. A request for vectographs should include virtually the same information as does a request for aerial photographs and in addition should indicate the type of vectograph desired—slide or print. They are normally made in contact size of the overlapped stereopairs, approximately six by nine inches, but may be made in continuous reconnaissance strip form showing extended areas.

In addition to the ordinary vectographs made from vertical aerial photographs it is possible to produce them from oblique photos if the original negatives have been specially expressed. Likewise they may be made from terrestrial photographs. However, up to the present time no reports from the combat zones have been received here at the Command and General Staff School of the use of vectographs made from terrestrial or oblique photographs.

No doubt there are many more uses for these three-dimensional vectographs than those thus far discovered and reported. As more commanders and staff officers become familiar with them, their use will certainly be expanded. Their field of usefulness has just begun to be explored. Anyone interested in the technical details of the manufacture of these vectographs may secure complete information at any Air Forces photographic laboratory.

Germans Entertain Americans

From *The Times* (London) 4 January 1945.

THE Germans recently attempted a diversion on the Fifth Army front by entertaining American troops with loud-speakers. The first performance was given on the night of 30 December when a speaker called "Hullo!" across No-man's-land, naming an American unit which the German apparently believed was occupying that sector. He added: "Now sit back, boys, relax, and listen to some good old American swing." Some jokes followed the music.

On New Year's Eve the performance was repeated. This time an attempt was made by the Germans to filter into the American lines while attention was diverted by the music. The ruse was quickly detected, and both the enemy patrol and the loud-speaker were treated with mortar fire.

The Strategical Situation in Europe as of 1 March 1945

COLONEL CONRAD H. LANZA

AT the beginning of the year, Germany was being attacked on three fronts—eastern, southern, and western. The eastern front extended for about a thousand miles from the Baltic Sea near Memel, around by Warsaw and Budapest, to the Drava River (see sketch). About 200 miles of front in Hungary were active. A Russian army group was besieging a mixed German and Hungarian force of about five divisions in Budapest, and at the same time fighting off a relief expedition. About 800 miles of front were relatively inactive.

There was a detached 160-mile front in Latvia, where the Germans held a large beachhead. This had a high nuisance value. It enclosed the ports of Liepaja and Ventspils, which could have been of value to the Russian armies. Its batteries closed the main ship channel from the Baltic Sea to Riga, interfering with the use of that port. Thirty German and Latvian divisions reported as in the beachhead were a threat to the Russian line of communications to north-central Poland. To prevent the irruption of this force in rear of the Russian right, then on the East Prussian frontier, it was necessary to leave a large containing force to cover it.

The southern front in Italy was practically stabilized, and has remained so.

The western front had recently been the scene of a German counteroffensive in the Ardennes. This had, however, been stopped, and the salient which the Germans had won was in process of being reduced by the Allied armies of General Eisenhower.

This counteroffensive had started on 16 December 1944, and had reached its maximum advance of some fifty miles by the 24th. Thereafter, its gains were slowly and steadily won back.

The evidence so far available indicates that the mission of the German counteroffensive was primarily to prevent an Allied breakthrough of the West Wall, at the same time that an expected Russian offensive occurred in the east. Naturally, the German High Command was prepared to take advantage of any opportunities that might present themselves.

When the 7th U. S. Army in northern Alsace was weakened in order to furnish divisions to restore the situation in the Ardennes, the Germans moved forward and in northern Alsace reoccupied a considerable section of the Maginot Line, besides clearing the West Wall in this area. This gain, made in early January, was thereafter held.

In southern Alsace, a German effort to enlarge a bridgehead already occupied about Colmar succeeded for a short time. At mid-January, the Ardennes battle then going well for the Allies, American divisions were made available to the 1st French Army in southern Alsace. With this assistance, the German gains were not only annulled, but their entire bridgehead was eliminated.

In mid-February the Allies commenced an operation near the Dutch border. At first conducted by the 1st Canadian Army, the front was gradually increased to include the 9th and 1st U. S. Armies. The direction of the attack indicated that the mission was to clear the west bank of the Rhine. On 1 March this offensive was moving slowly but steadily.

The major fighting had been on the eastern front.

Eight Russian army groups (called "fronts" in Russian) have taken part in a carefully coordinated campaign, controlled by Russian General Headquarters. The main effort has been by six army groups on an original front of about 560 miles between the Baltic Sea and the Carpathian Mountains.

The campaign started on 12 January, when the 1st Ukrainian Army Group started due west from the upper Vistula, through southern Poland, on the axis Opatow—Czestochowa—Breslau. On 14 January the 1st White-Russian Army Group attacked from the middle Vistula, on a parallel axis Warsaw—

Berlin. These two army groups form the main striking force.

To cover the right flank, the 2d White-Russian Army Group attacked on 14 January in a northwest direction from the Narew River on the axis Pultusk—Danzig, while the 3d White-Russian Army Group attacked one day later from the East Prussian border with axis Suwalki—Königsberg.

The left Russian flank was protected by the 4th Ukrainian Army Group, astride the Carpathian Mountains, including Slovakia. This army group attacked on 15 January on an axis substantially east to west through the center of Slovakia. This was difficult country, rough mountains and dense woods, which were covered with ice and deep snow. This particular Russian attack did not make much progress.

On 23 January the 2d Ukrainian Army Group in Hungary attacked northwards against the southern boundary of Slovakia. At the same time, the 3d Ukrainian Army Group, which was west of the Danube, attacked northwesterly from the line Lake Balaton—Budapest; and the 1st Baltic Army Group attacked the Latvia beachhead, on the opposite flank.

The entire campaign has involved about as large a number of army groups as have ever been joined in a single campaign. There is no reliable information as to the strength of the opposing sides. German estimates indicate that the total Russian strength exceeds 340 divisions, exclusive of reserves, if any. Russian estimates definitely fixed the German strength as 200 divisions, plus about twenty Hungarian divisions. Assuming these estimates are approximately correct, the Russians outnumbered the Germans by nearly fifty percent.

Germany foresaw the coming Russian offensive for at least a month, for German commentators often spoke of it during that period. It seems probable that the German High Command made their first preparations to meet it during the latter part of November 1944. This included the Ardennes offensive in Belgium. Troops were withdrawn in Poland from the line of the Vistula. The German flanks in East Prussia and Latvia on the north and in Slovakia on the south were not weakened.

In view of these dispositions, the Russian center made a rapid advance and reached the line of the Oder River from Küstrin to Breslau and thence southeast to the Krakow area by the end of January.

Whereas, when the Russian advance started, their front was nearly a straight north-and-south line 560 miles long, at the commencement of February the front had the shape of a truncated triangle. The truncated head was opposite Küstrin and Frankfurt-on-the-Oder on a front not exceeding fifty miles in a north-and-south line. It was forty to forty-five miles from Berlin. The Russian flanks trailed off almost at forty-five degree angles to the right and left rear, ending in the vicinity of Königsberg on the north and Krakow on the south.

A fifty-mile front is narrow, and hardly sufficient for an attack against major opposition against an objective such as Berlin forty to forty-five miles away. All of February has since been taken by the Russian High Command in efforts to enlarge that north-and-south head on the Oder.

Two major operations have occurred. On the north, severe fighting has taken place in order to extend the line down the Oder River to its mouth at Stettin. On the south, the mission has been to seize the Neisse River line as far south as Görlitz. If these two objectives could be secured, the Russian front would be substantially a straight line from Stettin to Görlitz, 160 miles long. This would be ample from which to launch a major offensive.

Russian success has been partial. Germany reinforced its armies in Pomerania, north of Küstrin, during January. The Russian line has since advanced very slightly along the Oder, but has made advances of about thirty miles to a line substantially parallel to the Baltic coast, which at the end of February was thirty to fifty miles away.

In the south, the Russians in Silesia succeeded in reaching the Neisse River in some sectors, but failed in attempts to cross it.

The advance here averaged about forty-five miles during February.

February advances were relatively slow compared with that of the Russian center in January. Then the maximum was on the line Warsaw to Berlin, 280 miles within sixteen days—a fast advance made possible by flat terrain without important obstacles, and an enemy who had partly withdrawn. Incidentally, the advance was just one-half of the original base of 560 miles, and about as much as could be expected.

The German High Command has resisted a Russian advance in Pomerania more strenuously than in Silesia. Russian reports have identified numerous provisional organizations in the south, while first-class divisions have constantly appeared in the north. This appears to indicate that Germany fears a Russian thrust north of Berlin as being more dangerous than one to the south, say towards Dresden. The explanation is that a Russian advance in the north could not be enveloped if its flank rested on the Baltic Sea. On the other hand, a Russian advance in the south is open to a counteroffensive moving north from Bohemia, Moravia, and/or Slovakia.

The German High Command has continued to maintain strong flanks. The 1st Baltic Army Group has failed completely to reduce the Latvia beachhead. The 3d White-Russian came close to capturing Königsberg. A minor German counteroffensive (minor in comparison to the entire campaign) in the latter part of February disengaged Königsberg on the north. The Germans control the sea, and naval ships substantially aided troops on shore in East Prussia. According to German accounts, the 3d White-Russian Army Group is composed of eight armies. Powerful German groups now remain in East Prussia and Latvia.

The right German flank has not given much in Slovakia. In a month and a half, the maximum Russian gain has been under forty-five miles. In the latter part of February another minor German counteroffensive was launched going east just north of the Danube from the vicinity of Komarom. This has eliminated a Russsian bridgehead west of the Hron River. The mission of this offensive appears to have been to clear the north-and-south road and railroad in the valley of the Vah River. This is a major line of communications for moving troops and supplies along the front.

THE EASTERN FRONT—SHOWING PLACES MENTIONED IN THE TEXT.

On both flanks, the German High Command has taken special steps to maintain

the present shape of the front, which is concave with the Russians on the inside. Provided Germany has troops available for a major counteroffensive, about which nothing is known, this shape of front is strategically advantageous.

To protect this front, a German force south of the Danube endeavored to relieve Budapest and force back the 3d Ukrainian Army Group. This failed, but a Russian counteroffensive equally failed to drive this German force away.

According to information obtained from British sources, the German High Command believes that the Russians are at the crest of their power; that if their present offensive fails to end the war by next summer, the Russian people will revolt against Stalin or quit on the job, as previously happened in 1917. Basis for this belief is that the Russian people are desperately tired of the war and have no interest in various ideals promulgated by the Allies. The people understood the need for driving the Germans out of Holy Russia. That mission has been completed, and more territory than Russia ever claimed has been brought under Russian domination. The Russian people want to go home—at least the Germans believe this to be the case.

The German High Command has made numerous erroneous estimates of the situation. This one may be another. Assuming the reports are correct, they point to Germany fighting cautiously and not undertaking major counteroffensives: rather, keep the war going until summer comes and definitely prove, or disprove, the current estimate.

The two extreme German flanks are in Norway and in Yugoslavia.

From Norwegian sources, the German army in Norway is estimated at as much as twelve divisions. It is reported as establishing itself to carry on independently of the possible fall of the homeland. A considerable part of the German Navy, including large submarine forces, are based in Norway, and more are expected.

In Yugoslavia, the original force of Germans in Greece and the Aegean Islands has been withdrawing northwards, harassed and attacked by Marshal Tito's Partisans, Bulgars, Russians, and some British detachments. In spite of this, the Germans have withdrawn to an east-and-west line just below Sarajevo, and are slowly fighting their way northwards. Their strength has been reported as high as twenty divisions. It is doubtful if it is half of this. The line of retreat is from Zvornik on the Drina River and from Sarajevo to the northwest. It has been making sixty miles a month. All bridges have been destroyed and obstacles erected everywhere. The Germans have an engineer organization, on the order of our Seabees, which rapidly improvises crossings of streams and removes obstacles. Supplies are received by air.

As February closes, political conditions in Greece have improved. That country is now definitely under British control. Opposition has at least temporarily disappeared. No open opposition occurs in any other country.

Agitation has appeared in the Eastern Mediterranean regions, Mohammedan nations are endeavoring to unite politically for joint action. This has been tried before, but has, since the 16th Century, invariably failed.

In general, the strategical situation points to a need for the Allies to end the war against Germany as soon as possible. For Germany, her sole hope to survive is to keep the war going in the expectation that complications will arise which will prevent the Allies from continuing on.

The spot check inspection is the officer's first aid to good preventive maintenance of equipment, for it keeps little troubles from developing into big ones. No preventive maintenance program can fail if spot checks are made regularly and frequently.

—Maintenance Division, ASF

Tank Destroyers in Europe

MAJOR ASHLEY A. BLINN, *Field Artillery*
Instructor, Command and General Staff School

THIS article is based upon official reports by commanders and observers in France, Italy, and Africa. It has reference only to tank destroyers within the European and North African Theaters of Operation.

GENERAL

As the African campaign drew to a close, German tanks became fewer and farther between. What had been known as large armored attacks became increasingly scarce. The Germans no longer used their tanks to the extent they had earlier in the campaign. Tank destroyers were faced either with a life of idleness or with the prospect of going out and getting a job. They chose to get a job. These first battalions in combat also proved that they could deliver the goods on these secondary missions. At least one battalion commander convinced his superiors that his outfit could shoot indirect fire and do it well. Tank destroyers were also used as assault guns in support of infantry attacks. They neutralized enemy strongpoints, knocked out pillboxes, shot up antitank guns, and overwatched tanks.

These commanders know that an idle gun is a wasted gun. They envisioned many possibilities of employment for the thirty-six high-velocity, accurate, long-range guns in each tank destroyer battalion. They sold their ideas to their superiors. Those pioneers in Africa laid the groundwork for all tank destroyers in the European and Italian theaters.

The Germans have again economized in their use of armor throughout the Italian campaign and in France. One of the notable exceptions was the German counteroffensive of last December. They have habitually employed only small groups of tanks, often only four or five tanks at a time and these in support of infantry.

Here again the tank destroyers were faced with the proposition of going out and getting a job or sitting idle. This time they were prepared for the emergency. Additional training in Africa, England, and the United States, plus combat experience, had made many battalions proficient at indirect fire. Then, too, when the infantry needed a stone house shot up, a concrete pillbox blown in, a machine-gun nest knocked out, or an antitank gun taken care of, the tank destroyers were happy to step up and oblige. These missions have been accomplished so successfully that we find a policy in both the European and Italian theaters which requires that tank destroyers not employed on their primary mission will be used on a secondary mission.

Now this has not all been a one-sided transaction. The artillery has aided tank destroyers by firing on tanks out of direct fire range of the destroyers. At times it has loaned men and equipment to assist in indirect fire. It may provide fire support for destroyers moving into position. One tank destroyer battalion in Italy reports the effectiveness of this coordination. A small group of tanks had been observed in an area. Artillery fire was called on the target, and while the enemy "ducked," the destroyers moved into firing positions and delivered direct fire, knocking out two and dispersing the remainder of the tanks with several hits. This "scheme" allowed the destroyers to move into firing positions, get their hits, and move out of observation before the enemy could see and strike back.

The infantry does its turn by protecting the destroyers from German infantry accompanying tanks and by helping on projects which are designed to release more German tanks for scrap. An example of this cooperation was reported from Italy. A tank destroyer company had destroyed several tanks, but the enemy was retrieving them during the night. By getting together with the infantry, a trap was laid, and on the next night, when the Germans attempted recovery, the infantry mortars put up flares while the tank destroyers shot up the enemy recovery crews.

This brings up another development which

is of interest. It is universally recognized that a new battalion cannot be attached tonight and then be expected to function smoothly in diverse roles in the division team tomorrow. Too much depends on training, on personalities, and on preparation. Units and people must know each other in order to work together efficiently. Infantry-tank-tank destroyer-artillery coordination is possible only when the units have worked together. Today, reports from the theaters indicate that, insofar as practicable, each tank destroyer battalion is now "permanently" assigned to a certain division or tank destroyer group.

Yet another move has been made toward greater coordination of tank destroyers with the other arms. It might be stated that the field artillery has "mothered" its tank destroyer "stepsons" overseas ever since the close of the African campaign. Fifth Army Artillery was probably the first headquarters to step in this direction. The plan worked so well that most armies in Europe have assigned the tank destroyers to the artillery headquarters for training, employment, and supply. However, the tank destroyers generally function through the G-3 on their primary mission. In almost every army, corps, and division, the Artillery Officers have been given the additional responsibilities incident to the employment and coordination of the antitank means available to the unit. This imposes a heavy load on the shoulders of these commanders, so an antitank subsection has been added to their staffs to assist them in accomplishing the additional duties.

In the army and corps artillery section, we generally find an antitank subsection composed of two officers and two enlisted men. In the division artillery section, we generally find an antitank officer with two enlisted assistants. The antitank subsection may be attached to the artillery S-3 subsection for administration but usually deals directly with the Artillery Officer on all other matters.

The duties assigned to this antitank subsection generally include:

1. Preparation of plans for the employment of tank destroyer units.

2. Recommendations for the allotment of tank destroyer units to other units of the command.

3. In conjunction with other interested arms, the coordination of the antitank fires of all cannon-equipped troops.

4. Coordination of requests for antitank missions to be performed by the air forces.

5. Recommendations concerning the employment of massed artillery fires and supporting aviation to break up hostile tank assemblies and disrupt tank attacks.

6. Collection and dissemination of information concerning the terrain and the capabilities and limitations of enemy armor as it affects the action of the unit from the standpoint of antitank defense.

Organization for Indirect Fire

Until recently, the tank destroyers had only sufficient fire control equipment to permit them to perform the simpler mechanics. The battalions lacked personnel and equipment for survey, fire direction centers, and communications. The artillery necessarily did much of the work. These problems seem to have been overcome in most units. Equipment has been provided and crews have been trained so that the tank destroyers now can lean less heavily on the shoulders of the artillery. However, complex arrangements are avoided.

The tank destroyers normally execute indirect fire missions by individual company. The customary procedure is for a tank destroyer company to reinforce a field artillery battalion. The company has its own fire direction center and communications system and is capable of operating harmoniously with the artillery battalion.

Less frequently, a complete tank destroyer battalion may be employed in much the same manner as one of the organic artillery battalions of the division. This requires the tank destroyer battalion to establish a fire control center, and each gun company to establish a fire direction center. Most tank

destroyer units are neither sufficiently trained nor equipped to operate directly with division artillery on indirect fire missions.

The procedure of employing a tank destroyer platoon with a field artillery battery has generally proved unsatisfactory for several reasons, among which are the following:

1. The tank destroyer company commander loses control of his platoon.

2. The field artillery battery and its associated tank destroyer platoon are required to operate on the same party line, which results in confusion.

3. The tank destroyer platoon does not have a fire direction center. The field artillery battalion fire direction center is hampered because of the necessity to plot and compute the additional tank destroyers whose gunnery characteristics differ greatly from the artillery pieces.

Types of Indirect Fire Missions

Some indirect fire missions which are assigned to and successfully executed by tank destroyers are:

1. Reinforcing the fires of field artillery battalions.
2. Deepening and extending the zones of fire of the field artillery.
3. Targets of opportunity.
4. Counterbattery.
5. Harassing missions.
6. Interdiction missions.

Many units report that they most often fire harassing missions and observed fires on targets of opportunity. In one relatively quiet sector, a tank destroyer battalion habitually took over the night harassing and interdiction missions so that the artillerymen might sleep. These destroyer men caught up on their sleep during the day.

Tank Destroyers Use Artillery Air Observation Posts

Many divisions have reported that their attached tank destroyers are permitted to work with the artillery cub planes. One division artillery commander has adopted a system for the general support air observation post to work directly with the tank destroyer battalion attached to his headquarters. This commander describes the process substantially as follows:

Each tank destroyer has a radio channel which allows the tank destroyer to work on the artillery air-ground channel. Each company commander "listens in" on the air-ground net during the hours of daylight. When the air OP spots a target, he calls "Hello Xray—tank at (coordinates)." The tank destroyer company commander in this zone answers the call and notifies the platoon concerned of the target. The designated platoon commander checks in on the air-ground net and has the four destroyers of the platoon listen in. The platoon concerned then changes the identification panels on the tank destroyers that are to engage the tank, for identification by the air OP. The air OP then works directly with the platoon commander of the tank destroyers concerned. He assists the tank destroyers to sneak to positions from which they can engage the tank with effective direct fire, and keeps them informed of any movement of the target. This procedure is of great assistance in driving off or destroying tanks which are too close to the infantry to be engaged by artillery fire.

A similar procedure has often been used to shoot the tank destroyers in on an indirect fire mission.

In Support of Infantry

The tank destroyers have done much work in support of infantry. The general lack of strong armored opposition has permitted them to reinforce the organic antitank elements of the infantry and at the same time render assault artillery support. One of the most outstanding examples was reported from Cherbourg and its surrounding fortifications. Tank destroyers assisted the infantry by moving into well covered positions and firing at emplacements. After five to ten rounds, the white flag would appear. When the infantry worked up to the most important fortification in Cherbourg, they were temporarily halted. The Germans ma-

chine-gunned anyone who came near the entrances. The American commander called up tank destroyers to cover the operation. He ordered the destroyers to fire on the steel door of one tunnel entrance. Then he called upon the Germans to surrender. The answer was that General von Schlieben, the defense area commander, Admiral Hennecke, commanding naval forces in Fortress Cher-

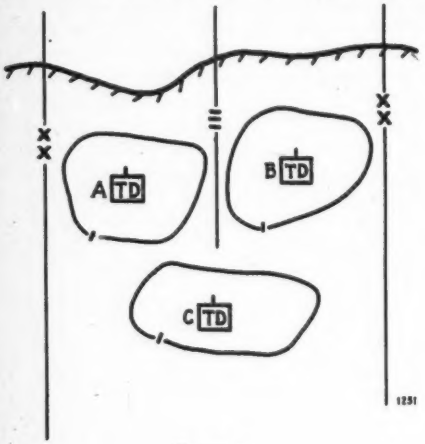


FIGURE 1.

bourg, their staffs, and about 800 other Germans capitulated. That was virtually the end of the defense of Cherbourg.

A tank destroyer company in Italy reported on a more everyday type of direct support to an infantry regiment. During one afternoon, this company knocked out two 170-mm self-propelled guns and was directly responsible for the capture of 150 Germans and for the killing of many more.

VERSATILITY

Let no one get the idea that all companies of a tank destroyer battalion must execute the same mission at the same time. A self-propelled battalion reports from Italy that in one phase of an attack, one tank destroyer company was supporting the infantry attack, another was supporting an armored attack, and the third was reinforcing the artillery. A reconnaissance platoon from the reconnaissance company was attached to each gun company. The report goes on to say that despite this variation in employment, the battalion was able to supply and control all three companies.

It has become a normal thing to read of a tank destroyer battalion executing its primary mission and with one gun company reinforcing the fires of the artillery. This employment often produces the best results.

EMPLOYMENT WITH SMALL UNITS

It is generally conceded that the attachment of tank destroyer units to echelons lower than the division artillery is undesirable. However, circumstances may make it impossible for a commander to control all elements of his battalion. These conditions probably arise most often during a pursuit.

In Italy, during the fast moving advance north from Rome, tank destroyer companies were frequently attached to infantry regiments because the distances involved and the difficulties of communications sometimes made it impossible for either the division commander or the tank destroyer battalion commander to control the antitank defense of the entire division sector.

During this same operation, some small task forces were formed with a medium tank company as the nucleus. These task forces usually included an attached platoon of M10 tank destroyers. They were attached on the assumption that the tank company commander knew that the destroyer is a supporting weapon to be used on overwatching and antitank missions, not as another tank. These tank destroyers functioned in the same manner as with larger armored units. They overwatched the tanks and protected them against heavily gunned and heavily armored German tanks and against antitank guns. They were also used both as antitank guns and as assault artillery to protect the flanks of the task forces.

WITH INFANTRY DIVISION IN DEFENSE

It is not intended to leave in the mind of the reader the thought that tank destroyers have not been employed on their primary mission—the destruction of hostile tanks by direct gunfire. They have been and are the

principal weapon for protection against enemy armor. Combat teaches best how to function in this role. I should like to point out some popular opinions which have been garnered from reports on combat experiences. These might best be expressed in reference to an infantry division in the defense when an armored attack is an enemy capability.

A tank destroyer battalion attached to an infantry division on the defense should normally occupy antitank positions initially (see Figure 1). The forward tank destroyer positions ordinarily are advanced no farther than the reserves of the front-line infantry battalions. These positions are selected in daytime and, if possible, are prepared and occupied during darkness. Each destroyer is completely dug in and camouflaged. Guns are placed so as to be mutually supporting and, whenever practicable, sited for flanking fire. Alternate positions are prepared when time is available. It is considered impracticable to attach any tank destroyers to the infantry. However, the tank destroyers and the antitank weapons of the infantry must be effectively coordinated.

If the two forward tank destroyer companies can adequately cover the division sector in width and depth, at least initially, the rear gun company may occupy indirect fire positions and reinforce the artillery (Figure 2).

This procedure is somewhat at variance with the former concept of holding at least the bulk of the battalion in mobile reserve well to the rear and of committing them to previously prepared positions only after the actual location and direction of the enemy tank attack is reasonably determined. It has been learned, and too often the hard way, that the movement to these prepared positions during daylight is likely to be discovered. Once discovered, we have lost surprise and, of more immediate importance to us, we have laid ourselves open to being knocked out by enemy artillery and bombing. In both eventualities, we have lessened our chances of successfully accomplishing our mission. Then too, we may not discover the approach of the enemy tanks until they are well into our position, the infantry has been overrun, and we can no longer fight on ground of our own choosing.

TRENDS

In retrospect, I believe it is possible to discern certain trends which seem to have been at work in European theaters ever since the close of the African campaign. These are:

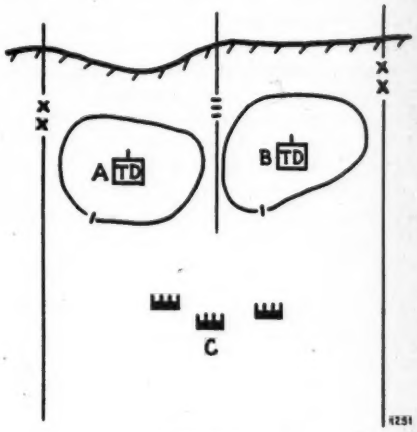


FIGURE 2.

1. A trend on the part of German armor to conserve itself, to employ only small groups of tanks.

2. A trend toward closer association of the tank destroyers with the field artillery.

3. A trend toward a greater coordination of tank destroyers with the other arms.

4. A trend toward using tank destroyers almost entirely in support of the other arms on both their primary and secondary missions.

5. A trend toward continually using tank destroyers in distinction to constantly holding them idle in mobile reserve.

SIAM--Signal Information and Monitoring

CAPTAIN WALTER B. POTTER, *Infantry*
G-3 Section, Seventh Army

THE giant convoy moved into position along the coast of southern France. The air bombardment ceased, the naval gunfire lifted, and the assault craft edged into shore. H-hour had arrived. Aboard the Seventh Army Headquarters ship, tense minutes slowly ticked by. At H plus 25 a report that initial objectives had been taken was received. This report came through SIAM radio channels. Similar SIAM reports continued to arrive in army headquarters at frequent intervals throughout D-day, keeping the army commander advised of the exact progress of assault units during this critical period of an amphibious operation.

SIAM—Signal Information and Monitoring —means two services in one: information for the army general staff and radio security for the army radio nets.

SIAM is not altogether a new thing, but a gradual growth since the days of its beginning in the North African desert campaign. The great distances involved usually prohibited the use of telephone and made radio the primary communication link. The need for early information on the part of the army commander caused the Eighth British Army to form mobile radio teams. These radio teams operated far to the front with the advance units, listening in on the radio nets. Information obtained was immediately transmitted direct to army headquarters, giving the army commander a preview of what was to come later through normal channels. This service came to be known as the "J" service in the British Army.

The first American use of this type service was by the Seventh Army in the Sicilian campaign. Small radio intercept teams were organized from the radio intelligence platoons for each division and performed along the lines of the British "J" service. Due to a shortage of radio equipment, full experimentation could not be made. However, the results obtained were sufficient to interest the Fifth Army in its future plans.

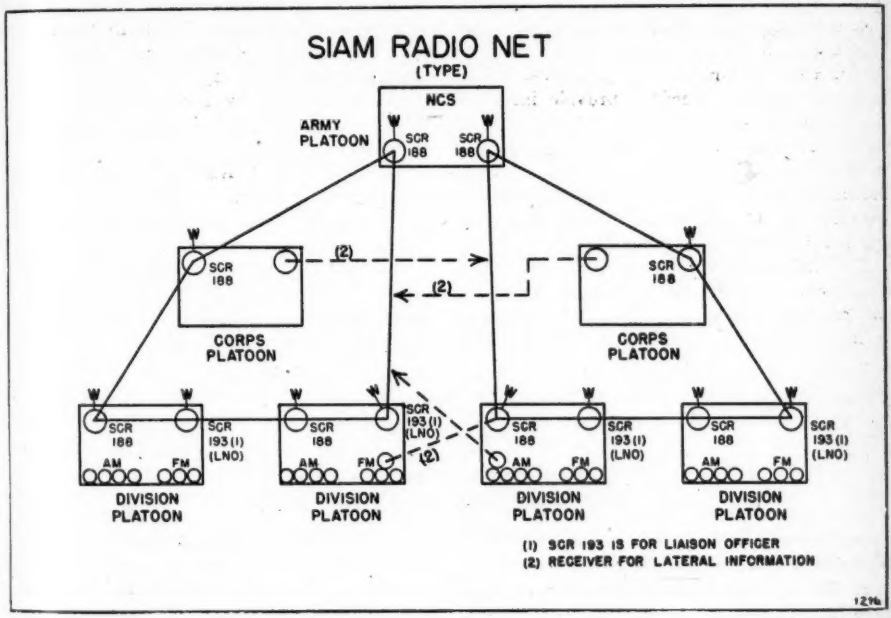
The first SIAM company was organized by the Fifth Army prior to the Italian campaign as a provisional unit using personnel and equipment borrowed from other signal units assigned to the army. Experimentation progressed and the original idea of listening in to advance units for information and monitoring for radio security was enlarged to include the use of liaison officers at division level to supplement the intercept information. Acting upon the recommendation of the Fifth Army, the War Department authorized the activation of a SIAM company. The — Signal Information and Monitoring Company, consisting of the original SIAM company, thereupon was activated under WD TO/E 11-87S and assigned to the Seventh Army for the operation in southern France.

SIAM, as now organized, provides an army platoon at army headquarters, a corps platoon at each corps headquarters, a division platoon in the sector of each division in the line, and a liaison officer at each division headquarters. A SIAM radio net is operated for the transmission of all information received by intercept or liaison. Normally, a separate net is operated for each corps. The division platoon monitors the radio nets of the division with which they are working, decoding, evaluating, and relaying in the SIAM net all intercepted messages of tactical significance direct to army headquarters. The corps platoons and the other division platoons intercept the messages and provide copies for their respective units. This provides lateral information as well as information to higher echelons. Logs are kept and all violations of radio security and procedure are referred to the signal officer of the unit concerned for corrective action with a copy to the army SIS section. The liaison officers at the division headquarters have a radio SCR-193 mounted in a ¼-ton truck or command car, a code clerk, and an operator. This set transmits information received from the staff sections. Such information is also sent in the SIAM net and thus is available to

lateral units as well as to higher headquarters.

The first field test of this type unit organized on a WD TO/E is now in progress with the Seventh Army in southern France. In the planning for the use of SIAM in the amphibious phase it was considered necessary, in order best to monitor the radio nets of the assault troops, to deck-load the division platoons on LST's. There they would remain during the daylight hours of D-day monitoring the nets, going ashore after dark when the nets are least active. The liaison officers would be with division headquarters and would land with the headquarters, having a SCR-193 to transmit information. A radio set aboard the army headquarters ship and the corps headquarters ship would be made available to receive the information.

The late date at which the SIAM company was activated and assigned to Seventh Army prevented its complete utilization in the amphibious stage in the manner considered most efficient. It was found impracticable to load the division platoons as planned with the exception of the — Infantry Division. No radio set was available aboard the corps headquarters ship and only a receiver was available on the army headquarters ship. Thus, information had to be broadcast with no assurance of its receipt. The loading in the case of the other assault divisions was in Liberty ships; therefore, no information could be expected from these SIAM detachments until after they had landed. Information poured in from the —Division, while the first and only message received through any channels concerning the other assault divisions arrived at H plus 285: "Assault divisions proceeding according to plan." Information continued to pour in the following day from the — Division. Information was then coming in from the other assault divisions through normal channels, but continued well behind SIAM information. The first SIAM messages from the other



units began on D plus 2, when the platoons had unloaded and normal operation began.

Thus SIAM operated during the amphibious phase. The usefulness of this service, however, did not end there. The advance of the Seventh Army inland was rapid and it became impossible to keep telephone wire in to the division, with the result that information continued at a premium. Extensive use was made of liaison officers from army to corps. This has proved very effective. SIAM, however, has continued to provide information of value up to eight hours in advance of other information. From 1000 in the morning to 2200 hours have proved to be the most fruitful hours so far, with normal information catching up around midnight and then falling behind again during the day.

The information received has provided a good preview of the overall picture. Intercept information is only as good as the source and is not considered official. SIAM information is not evaluated by corps; however, it paves the way to quick action upon requests from lower units.

The results obtained thus far have shown the technical soundness of this type unit. Some adjustments have been necessary due to the rapid rate of advance of the Seventh Army. As lines of communication became extended, direct transmission in some cases was impossible and relay was necessary. To keep abreast of the rapidly moving situation, platoons had to be made entirely mobile. This was accomplished by operating with reduced personnel.

This, then, is SIAM as it has been and is functioning in the Seventh Army. The information provided has been most valuable. The assistance it renders in maintaining radio security, while less evident, is of equal value. Changes will always be necessary to meet changing conditions but the underlying principle has proven itself.

Ten Roots of Leadership

Colonel J.B. Ladd in *The Army Officer.*

1. Be a vigilant leader. Know your men. Use good judgment and common sense.

2. Be a competent leader. Know your "stuff." Make quick, sound, definite decisions. Use simple plans. Issue clear, complete, and concise orders.

3. Be an efficient leader. Maintain unity of command, cooperation, and teamwork. Develop mutual trust, confidence, cohesion, and initiative in your unit. Follow up your decisions, plans, and orders with clear-cut, vigorous action.

4. Be a loyal leader. Keep the "soldier's faith," in service, fidelity, and duty. Take a vital, sincere interest in the welfare of your men and officers. Build esprit de corps.

5. Be a trustworthy, dependable leader. Never let your men or officers down. Deserve their trust. Drive hard to accomplish your missions on time.

6. Be a firm, friendly leader. Cultivate character, respect, courtesy, good will, good manners, tolerance, dignity, and tact. Treat your men as you would wish to be treated.

7. Be a resolute leader. Set the examples of force, courage, valor, esprit, honor, and high morale for your command.

8. Be a disciplined leader. Remember, hard work and iron discipline doubles victories and halves losses.

9. Be an alert leader. Always be on guard. Protect and take care of your men. No man is fit to command who neglects his "all-around securities."

10. Be an aggressive leader. Pay strict, prompt attention to duty, justice, and responsibility. Practice what you preach. Set the high example in the cardinal virtues of command. At all times, teach your officers and men battlefield leadership.

Advanced Landing Strips

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IN this day of global warfare, doubt no longer exists in either the lay or professional mind as to the importance of the air arm. In the newer concept of the use of this arm it has become axiomatic that any operation, either land or water-borne, must have air cooperation and protection in order to be successful. Air superiority, even if only local and temporary, has become a "must" for the launching of successful operations. Many examples exist to support this truth, some of the more current being found in the part the air arm is playing both in the attack and in the defense in the European Theater.

Out of this concept of the employment of the air arm has grown another axiom. In order that this intimate cooperation and protection can exist, it is imperative that landing strips keep pace with the ground elements, whether the progress is over land, over water, or through virgin and practically impenetrable country. This is necessary to achieve efficient operation. Communication and liaison between ground and air are simplified. Planes can spend their flying time close to the target area instead of expending precious time and gas getting to and from the target area. Wear and tear on crews is thereby reduced.

All of this brings us to the point of this discussion. How do these advanced landing strips come into being? They are, of course, another job for the engineer, and one which has, like many others, been a development of this war. But it is not the mere job of building such a strip that causes the headache. It is rather the conditions under which such construction must be performed.

Place yourself in the shoes of the Chinese engineer who was told at the end of the first week in January that he must have ready by the end of March a landing field with a runway 6,000 feet long and 150 feet wide that would accommodate planeloads of 26,000 pounds.

Not one piece of mechanical equipment did this man have access to. His job had to be done by hand labor. It involved the removal of the topsoil from over 1,000 acres, or the movement of 1,050,000 cubic meters of earth. His finished runway was five feet thick. First was laid a layer of stone three feet deep, carried by basket and wheelbarrow from a neighboring stream bed over distances ranging up to one-half mile. Next, a layer of compacted clay was put down, and then another layer of stone. Finally, the surfacing was placed in three layers, the first layer being boulders set in lime mortar, all mixed with the feet. To bring water to the runway, a ditch was dug parallel to the landing strip to bring the water from ten miles away. Next, a layer of lime concrete was placed, and on top of this a one-and-a-half inch layer of crushed stone bound with clay and covered with an inch of sand. All of the stone was crushed by hand. The surfaces were compacted by homemade rollers up to ten tons in weight which were also drawn by manpower. These rollers were cast of concrete on the job.

To accomplish this task, this Chinese engineer had as high as 100,000 laborers working on the job at one time in twelve-hour shifts.

Or let us take another example, in the Aleutians. On this island a strip was needed very quickly, and the engineers were hard put to it to find a site with clear approaches and with sufficiently good foundation to permit quick construction with a minimum of work. One site after another was discarded because of the time factor or other unsuitable condition. Finally, the eye of the engineer hit upon a lagoon which lay close to, and parallel to, the beach. This lagoon was tidal and was fed by a creek. A quick check showed the bottom to be a sand bed similar to an ocean beach. Why not?

At the end of eight days the diversion of the creek had progressed sufficiently to keep the creek water from the lagoon. At the same time, tidal gates were installed to protect the seaward end of the lagoon, arranged so as to drain the water out at low tide and

prevent the inflow at high tide. Two days later sufficient work had been done to permit the landing of a plane on this strip of sand. Two days more were required to lay sufficient landing mat. The first planes to operate from the strip landed that day. While not yet a completed airfield, the strip had been placed in operating condition in twelve days from landing. Impressed with the initial success of the engineers, the air commander decided upon the development of the site to a bomber field, which involved the construction of several additional runways, a comprehensive system of drainage and dikes, and many other facilities associated with such a field. [See "An Engineer Job in the Aleutian Islands" in the MILITARY REVIEW November 1943, p. 44.—The Editor.]

Another interesting example occurred in North Africa near Bône. Here the problem was to get in a field, during the rainy season, which would permit efficient area defense as well as other operations. Adequate sand was available but was located in coastal dunes across the river from a mud flat, which was the only suitable site for such a landing field. Only two weeks were allotted to the job. In this case, the engineers had to push their sand road ahead of them, crossing the river by means of an earth causeway. With the help of a good break in the weather they were successful in placing 66,000 cubic yards of sand on the runway. This sand blanket reached depths up to five feet in places, and was 150 feet wide. Immediately behind the sand came the steel landing mat. Their task was further complicated by bombings by the Germans.

I recall one instance where our outfit was selected to accompany a task force to a coral island and build an advanced military airdrome, all-weather and of the more permanent type, suitable for all types of planes and all types of operation. This was a typical Southwest Pacific coral island, with practically no hills and no roads, and covered with second-growth jungle vegetation mixed in with some jungle rain forest.

We encountered the usual problems of an amphibious force, moving by landing craft with a relatively large engineer outfit with all of its heavy equipment. As usual, the move was accomplished in a period of rains such as only the tropics can produce. I leave to the reader's imagination the task of moving some 20,000 ship tons of heavy equipment fifteen miles inland, without roads, over soil that consisted of a fine black silt which overlaid the coral. One trip over with a vehicle was sufficient to work this soil up into a material resembling black gear grease. The second and third trip brought about a consistency resembling chocolate syrup. Two days were expended in getting this equipment assembled in the bivouac area.

Needless to say, as rapidly as dozers got through they were put to work on the clearing for the landing strip. First, the jungle growth was stripped, which in this case was easy for a D-8 dozer. Then the topsoil was stripped to bare the coral which was to form the subgrade. This layer of topsoil varied in depth from a few inches to over a foot, but there were many places or pockets where the soil reached depths of up to ten feet or more. In addition, the terrain was rolling but with no definite drainage systems.

This produced our greatest problem. We still had our rains with us (the monthly average being fourteen inches). We had a deadline to beat, and had to continue operations in spite of the weather. What was to become of the water which collected in these pockets and depressions? The reader can imagine our chagrin, after a tropical shower of several inches of rain, to find one of these depressions, which we had been so carefully filling with selected material, full to the top with water, which made a jelly of our new fill. All of this material had to be removed *after* we got rid of the water. Our problem was to find a way of preventing this water from collecting while we were grading the strip; and, too, we had the drainage of the finished strip to provide for.

A hasty council of war was held. Someone discovered that in the native coral there were craters up to eight or ten inches in diameter, some seeming to be bottomless. It was further discovered that if the loam with which these

craters were plugged was removed they served as a natural drain and, provided they were kept clean, would take water indefinitely. Right here was the solution to our most difficult problem. By making use of these natural drains which nature had provided for the relief of the harassed engineer, we were able to have 4,000 feet of strip surfaced and in use in twelve days in spite of weather and sporadic Jap bombings.

In another case, in Burma, the engineers were called upon to provide a strip in a hurry. The time schedule and transportation difficulties did not permit even steel landing mat. They therefore picked a site which required practically no earth work, graded up the strip, and had thousands of square feet of bamboo mat prepared by the natives, which the engineers laid, staked down, and covered with sand. Again planes were landing within a very few days of the start of the work.

Having looked at several examples of methods and expedients used to provide landing fields in a hurry, I will endeavor to put a handle to some of these problems in terms readily understood.

One of the problems (common to all services) is that of movement of the necessary troops, equipment, and material. This is more particularly true in the case of amphibious operations. If landing strips are to go in concurrently with ground operations, the necessary engineer troops, supplies, and equipment must be loaded with the assault convoys. This places a heavy additional burden on logistical requirements for the task force. There is always a tendency to try to persuade the engineer to trim his estimates of material and supplies.

Perhaps the most serious problem for the engineer is the matter of site selection. In the case of advanced landing fields, the prospective sites are controlled by the enemy. This makes advance ground reconnaissance nearly impossible, and leaves available to the man selecting sites only such maps as may be available of the area, intelligence studies, and aerial photographs. Obviously these are not the complete data upon which an engineer would like to base his selection. For example, in one operation a beach which had been selected during planning as a good, sandy landing beach, based on aerial photos, actually turned out to be coral mud overlaying coral heads. In another case, a bay that had been selected as a good site for piers for deep-draft vessels was found to be rather poor, as hydrographic data showing water depths supposedly in fathoms were actually in feet. Such an error in data used to select landing strips could, then, be very serious. There is no substitute, therefore, for a final ground determination of a site.

What are the factors which determine the suitability of such a site? There are the usual operating characteristics which a landing field must possess. They are: suitable approaches, easy grades, adequate room for dispersal of aircraft, suitable areas for storage of gas and ammunition, and accessibility by road from supply and port installations.

There is, however, a factor which can under no circumstances be overlooked by the engineer. That factor is the ability of the soil at the proposed site to sustain loads. It frequently happens that a site which will meet all the above qualifications will not meet this requirement. While it is quite possible, with sufficient time, labor, equipment, and material, to prepare a base which will carry the load, it must be remembered that advanced landing strips are required in a matter of days rather than months.

The principle involved in preparing a base which will support plane loads is a very simple one. Just as snowshoes or skis distribute the weight of the wearer over a large snow area, thereby enabling the snow to support the weight, so must the base or foundation of a landing strip be prepared of selected material which will distribute wheel loads over a sufficient area so that they will not exceed the carrying capacity of the natural soil underneath. This involves a knowledge of soils on the part of the engineer.

Just as in the case of roads, heavy traffic on a runway will cause the surface to ravel and get rough. Likewise, saturation of the soil will in many cases lower or destroy entirely its carrying capacity. This makes it

necessary to provide a wearing surface. Pierced plank steel landing mat provides such a wearing surface but does not provide waterproofing. Therefore, the wearing surface most preferred is one which will, at one and the same time, seal the surface against water and provide a wearing surface or pavement. We now see that site selection must consider this factor of suitable material available locally for providing a foundation, and whether or not local material is to be used for the wearing surface or whether prefabricated materials must be shipped in for this purpose.

The next largest problem is the weather. Weather does affect military operations, but in general from the engineer's viewpoint no allowance is made in his target date for weather. In fact, amphibious operations are often scheduled to make use of bad weather for tactical reasons. The engineer is then faced with the problem of carrying on his work in weather which in civilian practice would shut down the job. As cited in one of the examples, methods must be adopted and expedients and techniques devised to carry on the work regardless of weather. Filling a depression with earth that will be solid and capable of sustaining loads becomes quite a problem in a downpour of rain.

This problem of airfields and landing strips is one which belongs primarily to the aviation engineer. On the other hand, no engineer service is worthy of the name if it is not flexible enough to cope with changing demands and conditions. We find, therefore, all engineers involved in this problem at one time or another. The war thus far is replete with examples of many different types of units turning out successful results on this type of work.

The problem of advanced landing strips is one which is of the greatest importance to all elements of the army. Few of the many engineer problems arising from this war present a greater challenge to the engineer who is willing to start in where the book leaves off. Much of our success so far in this war is due in no small part to the manner in which this group of individuals has accepted and answered this challenge.

The Kachin Rangers

Digested from an article in *The Times* (London) 2 January 1945.

THE American Kachin Rangers, another of the picturesque "catch-'em-alive" irregular forces, formed late in 1942, now include a large number of Kachins, those sturdy Mongoloid hillmen who inhabit northern Burma and number more than 400,000.

The American officers, volunteers from all three services, are trained in the United States and then sent out here. The task of the force is long-range penetration. They accompanied and preceded General Stilwell's advance down the Hukaung valley. They have killed 3,000 Japanese, nearly all in ambushes and light skirmishes; they have taken and flown out thirty-five Japanese prisoners; and they have rescued 220 airmen forced down in the jungle, including many Air Transport Command pilots flying "the Hump." One group blew up ten bridges and six trains on the Mandalay-Myitkyina railway. Another group destroyed a Japanese dump estimated to contain 300,000 pounds of food, clothing, and ammunition. One lieutenant has walked 1,200 miles during the past six months.

The Kachins are armed with all modern automatic weapons. Units in the field are maintained almost entirely by supplies dropped from the air. Both American officers and Kachins have often been dropped by parachute. The Kachins love it because it gives them great prestige in the villages. Most of them drop with bare feet, and some have done it four times. Many of the Americans speak Kachin, while others rely on interpreters.

Replacement Pipelines to Battle*

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THE pipelines carrying replacements to the many battle fronts are long and tortuous, with many control valves, booster stations, reservoirs, and bleeder lines along the routes. Many thousands of replacements are required to fill these pipelines, other thousands are in training in the United States being prepared to be pumped into the pipelines, and still other thousands are in reservoirs near the delivery ends of the pipelines, waiting to be called to active operation. The replacements travel through the pipeline system in a solid flow, yet each has individual characteristics and training. Near the delivery end, sorting and screening agencies pick out those military occupational specialists (MOS's) needed by unit commanders—and the supply does not always match the demand. It is not always easy to find or locate the replacements having the military occupational specialties needed, even though they are in the pipelines somewhere. Replacements move through the replacement pipelines at an average rate of say fifty miles per day and may be en route to the front some three or four months. Considerable care and forethought must be given to the numbers and MOS's of the replacements committed to the pipelines. This discussion is concerned with the planning for maintaining an adequate flow of replacements through and out of the pipelines.

The objective of any replacement program is to supply replacements to each military commander at the right time and place so as immediately to restore his unit to T/O strength in combat effectives. The commander would like each replacement to be battle-trained in the particular skill or MOS of the vacancy he is to fill, and oriented and equipped for the climate and terrain in which the unit is to operate. Such an objective would require approximately 500 different types of skills or MOS's, each in about three grades or ratings, sorted into physical profile serials A, B, and C, and grouped according to age and temperament. It is obvious that an exact filling of replacement requirements for each vacancy would require a prohibitive number of varied MOS's, grades, physical profiles, and specialists in the replacement depots.

Before discussing in detail the replacement problem, let us review briefly the staff responsibilities concerned with personnel replacement. The personnel sections of general staffs of all echelons are charged with the formulation of policies and the supervision of the execution of administrative arrangements pertaining to the procurement, classification, assignment, and promotion of all personnel, including replacements. Effective personnel plans and policies have always been desirable and necessary because of their important effect on individual and unit morale and on unit efficiency. They are critically essential when making plans for and carrying through replacement procedures. The necessity for efficient replacement procedures has increased because of the manpower shortage, a higher turnover, and an increasing loss rate.

Replacement procedures include personnel procurement, classification, assignment, training, delivery to theaters, and distribution to units. Let us assume the prospective replacement has been inducted and is ready for military assignment. A brief review of military assignment procedures is indicated, inasmuch as replacements are identified almost entirely by their military occupational specialty and do not have the same opportunity for adjustment as is available in large units such as an infantry division. Thus, the replacement normally is classified, assigned to a training unit, and, on completion of that

*For background on replacement procedures see also: "Personnel Replacement Problems" by Lieutenant Colonel Benjamin F. Boyer, Inf., MILITARY REVIEW November 1943, pp. 38-41; "G-1's Sixty-Four Dollar Question" by Lieutenant Colonel Louis Duenweg, AGD, MILITARY REVIEW April 1944, pp. 24-28; "How to Get Facts and Influence People" by Lieutenant Colonel F. H. Walton, Jr., AC, MILITARY REVIEW December 1944, pp. 52-56; "War Is Dangerous" by Lieutenant Colonel Louis Duenweg, AGD, MILITARY REVIEW January 1945, pp. 65-68; "Overseas Replacements—Personnel Accounting System" by Lieutenant Colonel J. M. Emigh, FA, MILITARY REVIEW February 1945, pp. 49-54.

training, goes to the theater as a replacement with very little opportunity for changes in his assignment or program of instruction, once he has been initially classified. It is therefore necessary, in the interests of efficiency, usefulness to the service, and the morale of the man himself, to use the utmost care in making the initial assignment.

However, prior to initial assignment to a specific military job, each person is tested and more or less completely classified. Classification discovers pertinent data concerning the individual's abilities, physical capabilities, emotional stability, education, intelligence, aptitudes, occupational history, military experience, interests, personal traits, and other qualifications. These attributes and skills are recorded so that through their use the individual can be assigned where he will be of the most value to the service. Proper classification expedites the completion of military training, prevents wastage of skills, and builds up morale.

Classification is continuous. Personnel sections should establish classification policies which make certain that combat units are given priority in the assignment of potential leaders and men with previous military experience; that appropriate initial assignments are made, thus minimizing the number of subsequent transfers; that available occupational skills are distributed where needed; that classification records are kept current so that unusual skills may be easily located; that men not qualified for combat duty are properly assigned; that no unit is unduly burdened by training more than its share of Class IV and V personnel; and that properly qualified personnel are chosen for schools and special training.

A classification officer, functioning under the approved policies of the personnel section, has qualification cards to aid him in keeping a record on each man, including the AGO 66-1 and 66-2 for officers, and AGO 20 for enlisted personnel. On or with these cards are the results of tests and interviews, including the AGO test (predicting ability to learn), the aptitude tests (mechanical, clerical, etc.), trade tests, physical examinations, and interviews to determine what a man has done or can best do in the Army, as well as other pertinent and useful data. The information obtained through such tests and interviews is used as a basis for proper assignment and is entered on the appropriate qualification card.

As an additional aid in proper classification, a "Physical Profile Plan" has been initiated (Memo No. W40-44, WD 18 May 44). Its objective is "to provide a functional descriptive estimate of the soldier's general ability and personal fitness which, with his other qualifications, will be a means by which he can be assigned most effectively."

In determining a man's physical profile, the following six physical factors are considered: (P) physical capacity or stamina, (U) upper extremities, (L) lower extremities, (H) hearing, (E) eyes, and (S) neuropsychiatric. There are four grades in each of the six categories; grades 1 and 2 may be considered as roughly representing the general military service category, grade 3 approximates limited service (MR 1-9), while grade 4 is below the minimum standards for induction or retention in the service.

The physical profile serial thus indicates roughly a man's physical capabilities. These are considered in making initial assignments. The sturdier men are assigned to arduous training and the physically less capable men tend toward assignments in administrative or supply establishments. It should be borne in mind that the physical profile serial is an estimate only and should be used as an additional guide rather than a dictating factor in making assignments.

After careful initial classification, assignment is considered. Assignment places the officer or enlisted man on a specific job within an organization. Unit tables of organization prescribe definite numbers of grades, ratings, and skills (or MOS's). Experience indicates that an organization in a theater of operations frequently does not have all the MOS's prescribed, and it seldom receives replacements with all of the skills desired. When such a condition exists, the personnel section must recommend an equitable distribu-

tion of the replacements supplied, based on what each unit needs and the skills or MOS's actually received. The commander's wishes and G-3's recommendations naturally affect this distribution. Differing somewhat from the assignment of enlisted men, where the MOS is the chief guide, the commander exercises more latitude in the assignment of officer personnel. The Personnel Section Chief normally keeps a roster of all officers with data pertaining to their optimum and current assignments, where this is practicable.

Theater Replacement Procedures

With the above background of personnel classification and assignment procedures, and assuming that the replacement training has been completed, let us move into the G-1 office of an active theater and consider very briefly some of G-1's routine jobs connected with replacements. First of all, he must make estimates as to the numbers and types of replacements which will be required and the dates they will be required. Due to the length of the replacement pipeline, i.e., due to the time and distance required to bring a replacement from U. S. replacement depots to the front lines, his estimates will necessarily be on a long-range scale, say about four to six months.

Next, he must consider requisitions for replacements. These again are partly estimates, based on current shortages, on previous loss rates per month, and on contemplated campaigns or proposed task-force operations. He must make plans for the reception, processing, acclimating, deployment to dispersed replacement depots and battalions, possibly some special training and equipping, and finally the forwarding of replacements in small groups (assorted as to qualifications and training) into the combat units and theater organizations themselves.

Let us assume, then, that the War Department and the zone of the interior installations deliver adequate numbers of properly assorted and trained replacements to the ports of embarkation and on the dates required. Let us admit that the shipping time and the processing time in the theater have been properly estimated. There should be little difficulty in delivering replacements to the front-line combat units as needed. The replacement problem appears to be a straightforward military operation. Perhaps it is. It can be.

Theater Replacement Problems

However, some of the problems or pitfalls in the above procedures include the following:

a. The tactical and strategic situation in modern warfare tends to change radically in short periods of time. An example is the height of optimism on the European front early in December and the pessimistic and frightened newspaper reports at the end of the same month. Thus, replacement requirements may change much faster in quantity and type than the replacement load in the pipeline will permit. The result is usually a large-scale and hurried conversion of replacements from the MOS's in which they were trained to different MOS's which military necessity and the urgency of the tactical situation seem to demand. Replacements are taken from the pipelines with little regard for their MOS's and pushed up into the gaps. The net result is a series of upsets in the replacement supply schedules extending over a considerable period of time, and a consequent loss of properly qualified effectives at the front.

b. The time lag from embarkation at U. S. ports until delivery to the requiring theater units is not always easy to estimate accurately. The distance to the front in time and space may increase by bounds, particularly in the Pacific Ocean Area, while the necessity for relay stations, transshipping, and other delays tends to vary the shipping time widely from three to six months.

c. A factor which is frequently ignored is the lack of interest and emphasis placed on administrative procedures connected with personnel replacement handling. There is a tendency to assign the more experienced and capable officers to other staff sections at the expense of the personnel section. The operations section is usually more glamorous, but its plans may be nullified in an extended cam-

paign due to inexperienced officers in the personnel section and a resultant lack of replacements to maintain combat efficiency in the units charged with carrying out the G-3 plan. The G-4 Section makes elaborate plans for the logistical support of an operation. These plans are based on known rates of consumption of such items as food, gas and oil, and ammunition. Without an unending stream of supplies, the operation bogs down. Experience gives an equally predictable rate of consumption of manpower. For similar reasons, then, the theater G-1 Section must prepare adequate plans for replacements to support the tactical operation, or the units lose their combat effectiveness and the operation stops.

From the foregoing, it is apparent that a satisfactory solution to the replacement problem requires a coordinated set of plans, prepared and supervised by experienced and capable personnel sections and extending over a considerable period of time and distance. Also, efficient and trained commanders and executives must be provided to execute the replacement plans. Operating special troop groups are needed, just as much as personnel planning staffs. The War Department recognized this need, as is indicated by the letter of instruction to the commanders of the principal theaters, dated 4 May 1944. Extracts from the letter are quoted below:

1. As a result of experience gained in the North African Theater of Operations and considerations of all factors involved, the War Department is convinced of the necessity of establishing the following basic principles with regard to the organization and operation of replacement systems in all theaters of operation.

a. The theater replacement system as a whole will be placed under a commander whose sole responsibility is to operate the system under War Department and theater policies.

b. All unassigned personnel in the theater, except those that have been delivered to replacement units of field commanders, will be under the control of the commander of the replacement system.

c. Loss replacements are provided for the sole purpose of keeping units and allotments at strengths authorized by the War Department by replacing losses from battle and normal attrition. Replacements will not be used for other purposes without the prior specific approval of the War Department.

d. The following are essential to the maintenance of an effective replacement system:

(1) Continuous personnel audit for the purpose of:
  (a) Locating potential assignments within the theater for men not capable of combat duty.
  (b) Locating men capable of combat duty who are currently assigned to positions that can be filled by limited assignment personnel.

(2) A training and assignment system to insure the prompt preparation for and orderly assignment to appropriate duties of:
  (a) Men no longer physically capable of performing their previous duty assignments.
  (b) Men physically capable of performing combat duty who are withdrawn from communications zone units and activities.
  (c) Men converted from one arm or service to another to prevent the accumulation of idle manpower and the wastage of skills. Critical specialists defined by War Department instructions (supplemented by the theater commander if necessary) will not be converted, but any accumulated surplus will be reported to the War Department.

e. The detailed plan for operation of the replacement system will provide for:

(1) Careful estimates of total replacement requirements for several months in advance to maintain the theater replace-

ment level authorized by the War Department.

(2) Careful estimates of the potential supply of replacements from sources within the theater.

(3) Maintenance and improvement of the physical, technical, professional, and morale status of replacements.

(4) Establishment of replacement depots and subordinate replacement units as far forward in the combat zone as the tactical situation permits, with the object of replacing combat losses as soon as incurred.

(5) Establishment of a system of credits for major commands by the theater commander.

(6) Suballotment of credits and establishment of a system of priorities by major commanders.

(7) The segregation of replacements moving to the front from evacuees moving to the rear. These two categories of personnel will not be mixed in replacement depots, personnel centers, or training centers.

2. The provisions hereof are effective upon receipt of this communication.

3. Any and all previously announced War Department policies in conflict herewith are rescinded.

The above letter has been supplemented by various instructions and interpretations, and is gradually producing an operating agency theater-wide in view and geared for the handling of replacements on a campaign and task-force basis. The newness of the concept will require some time for the principles to come into full operational effect. It is noted that an operating organization for the processing and training of replacements now has been made available to each theater. With an efficient and informed commander at the head of it, there should be no difficulty in carrying out personnel plans promptly and efficiently and in maintaining combat and service echelons in the theaters at full operating efficiency, regardless of losses or the numbers of replacements required.

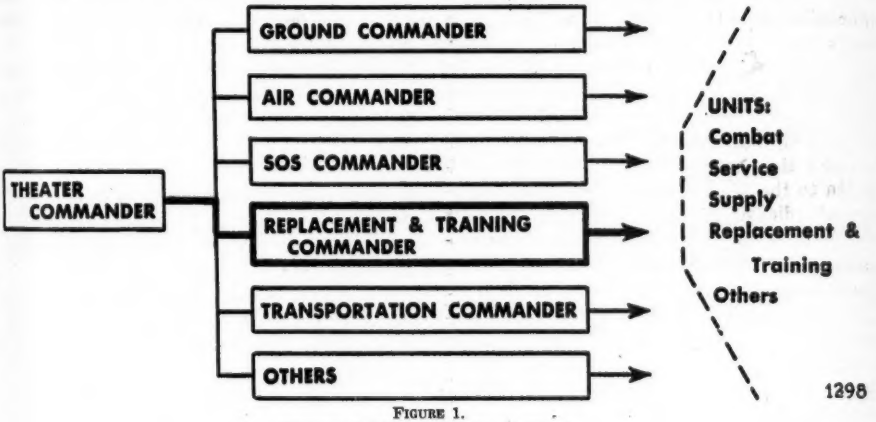


FIGURE 1.
THEATER COMMAND SYSTEM (TYPICAL).

Figure 1 indicates roughly the place of the Commanding General of the Theater Replacement and Training Command in the theater command system. Theater organizations vary. The chart is not all-inclusive, nor complete as to subordinate commanders and units. For example, the Air Commander commands both combat and service units. The Theater Replacement and Training Commander commands the theater replacement units and is responsible for their training while under his control.

In operation, a theater replacement sys-

tem visualizes that the theater, its armies, corps, divisions, and other separate organizations in the theater obtain needed personnel by submitting personnel replacement requisitions. As a rule, theater commanders anticipate their replacement requirements. Commanders responsible for the maintenance, at the proper levels, of replacement pools in replacement depots *anticipate* losses in accordance with the tactical plan, and requisition replacements accordingly. This is to facilitate the procurement and training of replacements in the United States. The theater submits to the War Department monthly loss rates, quarterly percentage tables for each MOS in a given replacement group by branch, and monthly loss estimates for the succeeding six months. The theater commander thus submits monthly a bulk requisition to the War Department. A bulk requisition indicates the number of replacements required by arm or service; military occupational specialties are not indicated on the requisitions but are assumed to conform to the quarterly rate tables. In a theater of operations, separate requisitions are submitted for "replacements," "fillers for authorized units," "fillers for authorized allotments," and "rotational personnel."

Divisions and smaller separate units requisition through administration channels for losses actually suffered. They do *not* requisition based on anticipated losses. However, for some special operations, balanced personnel replacement groups are forwarded automatically on an anticipated daily loss rate schedule.

Theater Replacement Questions

From the foregoing it is apparent that considerable progress has been made in keeping the pipeline full and in filling it with the appropriate numbers of the military occupational specialists required by the units of the theater. The theaters are tending to reach their authorized ceilings in manpower. The build-up of personnel classified as limited duty or limited assignment is reaching embarrassing proportions. Theater commanders tend to release to combat and service units the best qualified replacements available. This policy leaves an increasing residue of replacements not so well qualified for duty in the theater. In some instances these men, still carried on a replacement status, tend to deteriorate with inactivity so that they are no longer suitable or qualified for active duty in the theater. Some other problems facing theater commanders include the following:

a. Stagnation in various replacement depots of critical skill for which the demand is spasmodic but of which there must be a strategic reserve at all times to meet sudden emergency calls. The replacements in this group are usually highly intelligent and are impatient to put their training into practical operation. To correct this situation, critical skills are being consolidated in a sort of strategic reserve under the immediate control of the Theater Replacement and Training Commander. The number of highly skilled replacements is thus reduced and the individuals can be kept gainfully occupied while awaiting calls for them.

b. An overabundance of the senior grades in both officers and enlisted personnel in certain MOS's. The obvious answer is a courageous and intelligent program of testing and retraining, coupled with reconversion to other MOS's. A final measure for those not needed in the theater is return to the United States, and if not needed there, return to civil life and preferably to occupations connected with war production is indicated.

c. A tendency of supply and service units to "overstay" in rear installations, after the scene of battle has moved forward and away. To man such passed-over areas requires excessive personnel, all out of proportion to their strategic or logistic value. In other words, to use personnel efficiently, rear area installations must be ruthlessly rolled up, consolidated, decimated, or abandoned just as soon as the tactical situation will permit. The personnel freed therefrom must be made available for operations in the forward areas.

d. An increasing difficulty in finding suitable assignments for the growing numbers of limited service personnel. The answer seems to be in an extensive retraining pro-

gram for limited service men and officers. This can usually be effected by on-the-job training, so that the general service man may be released as soon as the limited service man qualifies for the job, and the general service man then may be assigned to a more strenuous and arduous task.

e. A failure on the part of general staff officers and especially of personnel section chiefs of divisions and larger units to appreciate fully the importance of sound policies for, and supervision of, replacement handling. Some of this is due to ignorance of the subject; some of it apparently is due to indifference to a job which requires considerable work with inadequate assistants and to which little glamour or recognition of merit is attached by senior commanders and their staffs.

The Practical Viewpoint

The foregoing presents only the principal factors affecting the replacement pipeline. Replacements are still individuals, each with his own characteristics, training, and ambition. He tends to improve in quality if wisely managed and particularly if he is kept busy at some duty which he feels he is capable of performing. He tends to move smoothly through the replacement pipeline providing reasonable consideration is given to his care and management. The facilities provided for such care and management in the theater are discussed in the following paragraphs.

Let us review first the Theater Replacement and Training Commander's functions. The Theater Replacement and Training Commander has as his *sole* responsibility the operation of the replacement system under War Department and theater policies. As commander of the replacement system, he commands all replacement depots and replacement centers in the theater. He is responsible for the functioning of the system, including the training and utilization of limited assignment personnel and the recovery, retraining, and utilization of able-bodied personnel from service echelons and communications zone activities. He classifies limited assignment personnel fed into the system from all sources. He maintains an inventory of all personnel in a casual status in replacement units or installations. He controls all unassigned personnel in the theater. He establishes operating procedures for those replacements who have been delivered to replacement units in the combat zone or are delivered to the control of field commanders. His replacement depots each consist of a headquarters and headquarters company and one or more (usually five) replacement battalions, with a capacity of 1,200 replacements per battalion. These depots, of about 5,000 replacements, are usually located in the communications zone; in them are maintained prescribed levels of replacements. In these depots are distributing, classifying, reclassifying, and equipping facilities; they provide some additional training.

A separate "replacement battalion" is a small replacement depot, consisting of one replacement battalion that has had its headquarters and headquarters detachment augmented so that it may operate independently when conditions within the theater make this separation necessary. In addition, replacement depots and battalions, similarly organized, are attached to the field forces. These installations serve organizations in the combat zone.

To make effective use of the replacements in the Theater Replacement and Training Command, personnel section staff officers of the combat and service organizations who ask for the replacements must understand how the replacement command functions. They must work in full coordination with the replacement directives and policies announced by theater headquarters and as interpreted by their own immediate superior commanders. Replacement requisitions and reports must be forwarded promptly and in correct detail when called for. Efficient replacement procedure requires up-to-date and accurate loss records, prompt requisitions, facilities for the reception, classification, and distribution of replacements and their records, and finally the assignment of the best qualified man (MOS) available to each vacancy.

Our military doctrine presupposes that

each organization and unit in the theater will be maintained with its full Tables of Organization strength or its authorized allotment strength. Unit commanders base their tactical and logistical plans on full-strength units. The replacement procedures outlined in this discussion practically guarantee to each organization and unit commander in the theater his full authorized strength in effectives. If each unit in the theater does not have its full strength in effectives, the fault can usually be traced to an ineffective theater replacement system commander, or to inefficient G/A-1's in the units, or both.

Air Employment Terminology

The following is quoted from a letter issued by Headquarters, Army Air Forces.—THE EDITOR.

THE expression "air support" has been used freely during this war to describe the relationship of air operations to surface force operations. This term, though descriptive of air power in action, is, nevertheless, objectionable because its implication denies the correctness of the principles for employment of air power as set forth in Field Service Regulations, FM 100-20, "Command and Employment of Air Power."

FM 100-20 establishes air power in a co-equal and interdependent role with surface forces in joint operations. Nowhere in this doctrine is the term "air support" or any of its variations used to describe air-ground cooperation. It is necessary to use in practice only correct terminology if a proper understanding of co-equal forces is to be universally achieved. In operations of co-equal forces, one force does not support the other in the sense that the word "support" has held for many years in military language. Operations of co-equal forces are carried out by joint planning and joint effort toward a common objective.

In a more specific sense the term "air support" does not adequately define the association of air power with surface forces. On the contrary it connotes an auxiliary role for air power—a subordinate relationship which is refuted by the lessons of past and current military operations in World War II. In all theaters, air power is exerting a major—if not *the conclusive*—influence toward gaining a favorable decision in joint operations against the enemy.

The expression "cooperation with ground or naval forces" is suitable to describe air participation. Each arm has a part to play; and it is perfect cooperation or teamwork which makes possible such hazardous operations as our amphibious landings in the Pacific, or the breakthrough in Normandy.

In view of this analysis it is desired that in all written and spoken expression by elements of the United States Army Air Forces, the terms "air support," "air in support of," "supporting aviation," and other variations of the term be no longer used to describe the association of air power with surface forces.

To aid in the avoidance of phraseology embodying the word "support," the following set of examples of objectionable terms, extracted from current reports on relationship of air force to surface forces, is furnished with admissible alternate expressions in each case:

Air support—air participation, air effort, air-ground cooperation, air-ground coordination, air strikes, air attacks.

Supporting aviation—participating aviation, tactical air effort.

Air in support of—air operating in conjunction with ground and/or naval forces.

Direct support, close support—battle area air attack, participating aviation, air strikes in the battle area, joint air-ground effort.

Air support missions—air missions, air strikes.

Air support operations—joint air-ground operations.

Ground-Air Teamwork in France

"WITHIN one month of the day when the Third U. S. Army and XIX Tactical Air Command of the Ninth Air Force began operations together in France, the armored and infantry divisions and covering fighter-bombers of this new ground-air team had broken out of Normandy and through Brittany, had firmly secured the line of the Loire, and had swept 140 miles beyond liberated Paris to within sixty miles of the German border." This statement introduces a report by the XIX Tactical Air Command rendered with the stated hope that "some of the many lessons in teamwork and technique which were learned in that eventful month may be of tactical value to other commanders."

Missions of the Tactical Air Command

The missions of the XIX Tactical Air Command in the order of priority were: (1) to attain and maintain air superiority; (2) to isolate the battlefield; and (3) to give close air support to ground units in combat. It was realized that successful accomplishment of the latter two missions would be dependent on the complete accomplishment of the first-priority mission.

Certain fighter-bomber groups flew armed reconnaissance over the battle area, in advance of the ground force spearheads, and on the flanks of the army. The task of armed reconnaissance was that "of isolating the battlefield, spotting and breaking up any concentration of strength, keeping the enemy constantly off balance, and interfering with his efforts either to reinforce or to run away." Railroads, marshaling yards, freight and troop trains, fuel storage tanks and dumps, gun positions, and troop concentrations were attacked with rocket, bomb, and machine-gun fire. "Bridge wrecking, however, was tabooed from the outset lest it interfere with the rapid advance of our forces. So swift was the pace of the advance that the enemy had no time to blow his bridges behind him."

Coordinated with armed reconnaissance were the numerous missions of the tactical and photographic reconnaissance group. During the month of August alone, 599 missions, of which 260 were photo missions, were flown by reconnaissance aircraft. In a single day, "thirty sorties were flown by our tactical reconnaissance P-51's, operating in pairs chiefly over areas on the outer fringe of operations. These two-plane patrols contributed considerably to the most effective use of the available air power, since fighter-bombers could be quickly directed to any important targets spotted. Thus less time was wasted in uneventful armed reconnaissance."

THIS MARK V TANK WAS LEADER OF A PANZER SPEARHEAD IN FRANCE. ATTACKED BY ROCKETS, IT RETREATED INTO A FIELD AND THERE WAS SET ON FIRE, PROBABLY BY .50-CALIBER FIRE. (OFFICIAL PHOTO, U. S. AIR FORCES.)

Armored Column Cover

"The practice of assigning to one fighter-bomber group the task of providing continuous cover for one armored division during daylight hours proved most satisfactory. Groups operated in relays of eight to twelve aircraft over the division. As each flight approached, the leader checked in by radio with the flight leader being released and also with the Air Support Party radio on the ground. Suitable targets still to be attacked were reported to the flight picking up the patrol. SOP with flights was to patrol ahead to a distance of thirty-five miles, seeking out possible

strongpoints or pockets of resistance which might hamper the forward movement of our armor. Such targets were attacked and also reported to the armored columns.

"In this highly mobile form of warfare the leading armor often outran its communications, and the army's latest information on the location of its spearheads frequently came from reconnaissance or fighter-bomber pilots. To make the most of this source of information, our pilots on armored-column cover were instructed to include in their reports, whenever possible, the point at which the head of the column was last observed.

P-47 CHECKS LOCATION OF HEAD OF ARMORED COLUMN IN FRANCE. (OFFICIAL PHOTO U. S. AIR FORCES.)

AIR SUPPORT CONTROL

"Because of the physical separation and rapid movement of the two or three columns into which each armored division was divided, it was found necessary to provide an Air Support Party for each column. The assignment and operation of a Fighter Control Center with fighter wings proved unsatisfactory for offensive tactical air control purposes. All available control and communications personnel were therefore organized into a provisional Tactical Control Group and placed directly under the control of the Advanced Headquarters, XIX Tactical Air Command. Elements of the Tactical Control Group were maintained very close behind the advanced ground troops and close to, but not necessarily with, the Advanced Tactical Air Command Headquarters.

GROUND ELEMENTS

"An adequate air service command and aviation engineer command are absolutely essential to the mobile tactical air force and have proved their worth in this theater," states the report, and goes on to stress the point that sufficient transportation must be made available to move and supply tactical air units over distances up to 300 miles if it is desired to keep the Tactical Air Command mobile.

FLANK PROTECTION FOR THE THIRD ARMY

"The swift pace of the Third Army advance posed many new problems, one of the most important of which was protection of the long flank along the Loire. The task of watching that flank and preventing any dangerous concentration was turned over entirely to the air—an important milestone in the history of air warfare. This task was successfully carried out by vigilant tactical and photographic reconnaissance backed by our fighter-bombers, who were continually attacking enemy troops and transport, interdicting movements by road and rail, and keeping the enemy constantly off balance so that small units had

little chance to 'snowball' into effective opposition."

Box Score for August

Flying 12,292 fighter-bomber sorties in August, the XIX TAC destroyed 229 enemy aircraft; damaged or destroyed 4,058 motor vehicles, 466 tanks or other armored vehicles, 598 horse-drawn vehicles, 246 locomotives, 2,956 railroad cars, 155 barges and other river craft, eighteen merchant ships, and eight naval vessels; attacked 222 gun positions, thirty-nine marshaling yards, eleven ammunition dumps, thirteen fuel and supply dumps, three radar installations, seventeen airfields, seven headquarters, forty-four troop concentrations and bivouac areas, fifty-eight barracks and other enemy buildings with good results; and cut rail lines at 122 different locations.

Our own losses were only 144 aircraft; the pilots of many of these planes bailed out and were able subsequently to rejoin their units.

Summary

The importance of these operations to the success of the campaign is obvious. The Commanding General, Third Army, said: "Due to the tireless efforts of your flyers, large numbers of hostile vehicles and troop concentrations ahead of our advancing columns have been harassed or obliterated. The information passed directly to the head of the columns from the air has saved time and lives." A member of the XIX Tactical Air Command stated in a letter that "this is the air-ground team the theorists have been talking about."

German supply column burning after strafing attack. (U. S. Army Air Forces photo.)

The Air Relief of Bastogne

From *The Sphere* (London) 20 January 1945.

The air relief of Bastogne, Belgium, made history. It was the greatest Allied air-supply effort ever made in the European theater, and it resulted in victory for the American 101st Airborne Division. In four days, after the fog and mist over the battlefield had lifted, the First Allied Airborne Army sent 342 twin-engined Dakota transport planes to the area, and more than fifty gliders were towed by other Dakotas to land inside the ever-narrowing perimeter with their precious supplies.

In Bastogne, the American casualties were being tended by three doctors, who worked day and night. When they signalled that drugs were urgently needed, gliders were sent in with surgical teams and first-aid personnel, as well as with the normal supplies. On the following day other gliders landed with signal equipment, medical supplies, and ammunition of all calibers. Thus nourished, the garrison was able to hold out until other forces pressing from the south advanced ten miles in five days to effect contact, after a siege lasting for eight days.

Notes

MAJOR GENERAL ORLANDO WARD
Commanding General, Twentieth Armored Division

MILITARY TOWER OF BABEL

SO often those charged with issuing orders and writing military literature fail to consider the background and understanding of those to whom the orders are issued. Terms used, such as "envelop the right," "line of departure," etc., which they think convey a definite idea, fail completely to do so.

As an example of the above, I attended a terrain plot exercise recently in which a young officer, attempting to utilize an accepted military term, used the words "line of departure" in connection with moving two assault guns out of woods into a firing position. Noting the look of inquiry on the part of NCO's to whom instructions were given, I asked one of them what he thought was meant by the term "line of departure," and to my amazement he indicated it to be a path to the rear along which they would retreat if things got "hot."

This man was an intelligent American; he understood English as generally spoken in the United States. We had yanked him out of civilian life, put him in uniform, and had used terms which are peculiar to the professional soldier. Now we are surprised when he doesn't understand, or acts contrary to the instructions which we have given him.

It is time for us to take stock, to consider the type, the understanding, and the English understood by the mass of soldiers who are receiving orders. We should discontinue the attitude that everyone is out of step but Willie if Willie is the only one who understands professional military terms such as "envelop the enemy's left," "line of departure," together with a mass of newly created abbreviations which would do credit to the confusion created at the Tower of Babel where "nothing would be restrained from them which they had imagined to do" until the Lord confused their tongues and they left off being of a common purpose.

It may be too late during the current war to change our methods, but certainly when we look into the future we should analyze carefully and approach with understanding the problem of language to be used in orders. A logical solution might be obtained if we ask the appropriate operational analyst or research agency now under control of the armed forces to study this question and determine whether or not "right hook," "starting line," "jab," and "right end run" are not better terms to be used than "envelop the enemy's left," "line of departure," etc., to say nothing of SOP, RL, WP.

Our terms must be simple, easily understood, and descriptive. We may be saving ink and paper by using abbreviations, and following tradition by using so-called military terms, but we run the risk of jeopardizing concerted effort so necessary to success.

FILLING THE GAP BETWEEN THEORY AND PRACTICE

Too often, map problems presented at service schools are so theoretical that the solution reached is not practicable. This applies particularly to problems involving large units where the mass of trains and supply installations is not considered in the play of combat troops.

Recently, after a school map problem had been solved by the staff of an armored division and in turn by the combat commands, it was decided to construct miniature models of vehicles in one of the combat commands and play the problem on the office floor. Seven hundred and forty-one model vehicles were constructed, including peeps, jeeps, tanks, recovery vehicles, and wreckers. When they were placed on the floor in formations comparable to those which would be used in combat, the commanding general's office was filled with combat vehicles and the trains covered the floor of the aide's office.

It was immediately apparent that certain solutions to the map problem which had been thought feasible and logical would be impossible to accomplish. Although many of those present had participated in maneuvers, and some in action during the current war, few

of them had realized the tremendous number of vehicles that were involved, and the difficulty of resupply of gasoline and ammunition.

For several years the writer has stressed the use of sand tables and both indoor and outdoor terrain plots as a step between the theoretical and the practical. He has advocated problems on terrain plots in which commanders are required to issue orders and use voice radio procedure so that prior to operations in the field they are thoroughly familiar with technique.

The benefits derived from using miniature vehicles on sand tables and terrain plots suggest a practical step between map problems and maneuvers which could well be instituted at our service schools, particularly at the Command and General Staff School. Map solutions should be tested by portraying the dispositions and movement of troops on the floor of the gymnasium or field house with miniature vehicles or blocks to represent vehicles and/or units. Or the exercise could be conducted on indoor and outdoor terrain plots, which can be constructed easily. It is realized that this procedure would be a radical departure from current practice, but a few problems worked out in miniature will more than compensate for time spent in preparation and will produce workable rather than theoretical solutions.

A Six, Not a Five-Paragraph Order

In football, soccer, basketball, etc., it is fundamental that a player first must be familiarized with the field on which he is to play. After he learns the play of the individual, he is taught the teamwork necessary for concerted action. No one who will stop and think can deny that the same procedure is all the more important in preparation for action on the field of battle, particularly in view of the fact that in battle the field changes constantly as action progresses.

This important subject is usually disposed of in a field order by a simple map reference. The map reference too frequently is a map which happens to have been issued to the command on an automatic supply basis. There are no stereoscopic pairs of vital areas and little or no consideration has been given to securing additional information of the terrain from other sources. In other words, knowledge of the field on which the game is to be played is left much to the imagination of the recipient of the order.

Certainly, knowledge of terrain, so necessary to effective maneuver of troops, should not be left entirely to chance. Certainly, its importance is sufficient for the one who issues the order, whose decision has been influenced materially by his study of the terrain, to highlight and picture to the recipient of the order what he considers to be the critical tactical features of the terrain on which the fight will take place.

It is suggested that, in spite of the long-standing and immutable rule of a five-paragraph order, an additional paragraph be inserted as a lead-off paragraph wherein the commander highlights what he considers the critical terrain features which will influence the play of the battle. Let it be six paragraphs—half a dozen—instead of five, with a common understanding of the critical terrain features thrown in.

In a report submitted by — of this board on lessons learned in the attack of fortified places in France, the following statement was made by the commanding officer of an infantry battalion. This statement will be of interest to engineer officers.

"The tactics I studied at Fort Belvoir and at the Assault Training Center in England in flame throwing and demolition charges are sound tactics. In the attack on — I was lucky enough to have a flame thrower to set the ammunition dump down inside the pillbox on fire, which forced them to surrender."

—From an observer's report

Battle for Peleliu

Digested at the Command and General Staff School from an article by Major D. M. Schmuck in *Marine Corps Gazette* December 1944.

During thirty months overseas, Major Donald M. Schmuck has participated in action from the Solomons to the Palaus, and his duty has ranged from rifle company commander to independent landing team commander in the New Georgia operation. Now on duty with the Division of Plans and Policies at Headquarters Marine Corps, he was assigned to the First Marine Division, for the Palau operation. He landed with the Fifth Marines on Peleliu shortly after H-hour and participated in the entire campaign.

THE target was Palau—apex ot drives started by Marines in the Solomons and in the Gilberts many months before. North of the equator and west even of Tokyo, the Palau Islands—long-fortified bastion of the Japanese Empire—lay within easy bombing range of the Philippines and prevented complete neutralization of Truk and the once-formidable Caroline chain.

The Third Amphibious Corps was given the mission of seizing the southern Palaus. The corps plan of battle directed the assault and conquest of the Peleliu Group by the First Marine Division, and the capture of Angaur by the 81st Army Division.

The Peleliu Group was composed mainly of Peleliu Island and Ngesebus, joined by a causeway built across the 500 yards of shallow water separating them (see sketch). Enemy airfields were located on both islands. A first-class, highly developed bomber base had been built on Peleliu. This was supported by a fighter strip on Ngesebus.

On Peleliu, just seven miles long and two miles wide, the Japanese over many years had lavished material and labor to build a great fortress capable of withstanding the onslaught of modern amphibious assault. Every conceivable defensive precaution was taken—natives were evacuated, troops were packed within the limited confines of the island, and the entire area became a restricted military zone. Reefs, beaches, airstrips, and ridges bristled with obstacles, mines, barbed wire, blockhouses, artillery, and mortars. Every ingenious device known to the Japanese was employed in the defense of this highly strategic base.

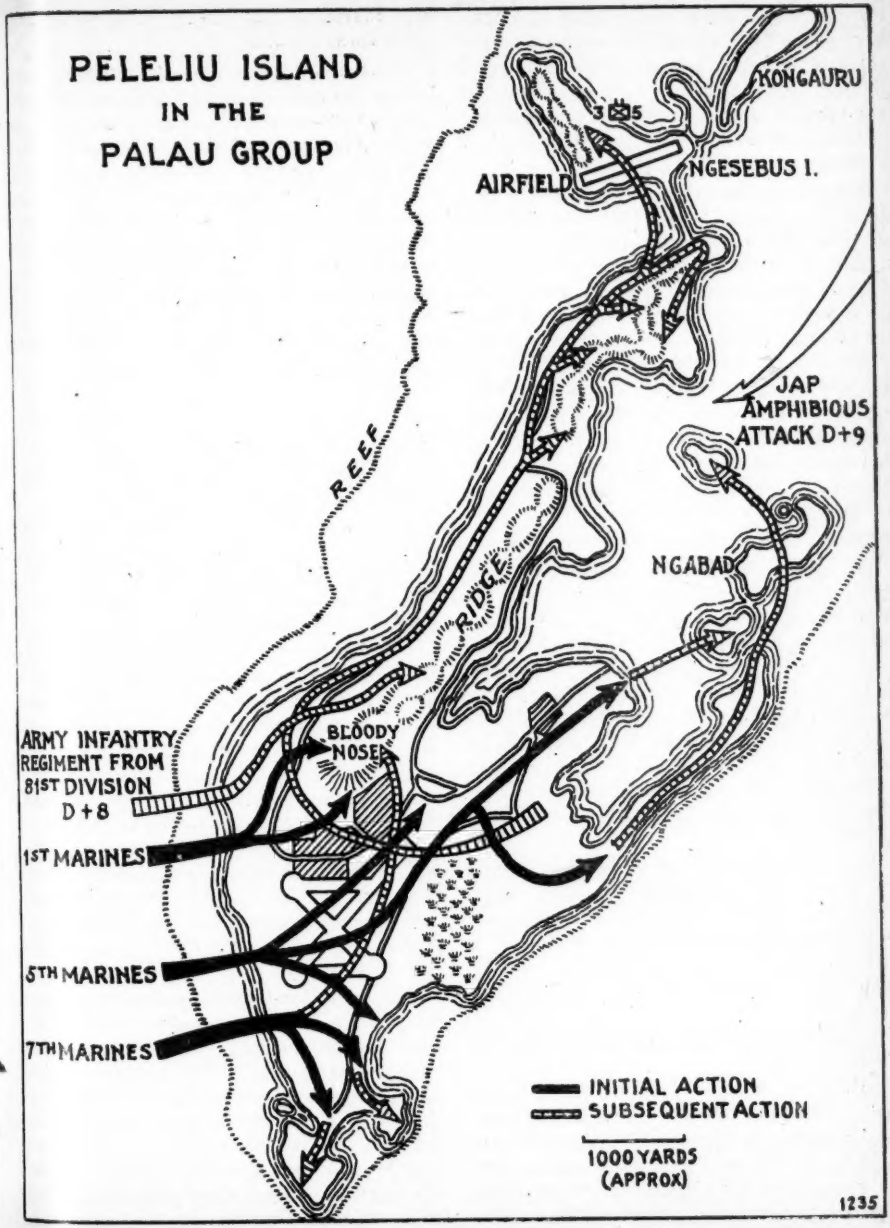
At dawn on 15 September 1944 the First Marine Division, Reinforced, lay off the silent reefs of Peleliu. Hard-hitting naval task forces had hammered the Palaus for days—battleships and carrier planes had reduced airfields and blasted the defenses. Aboard the transport fleet, last-minute intelligence and aerial photographs had been studied—every man knew his part. The time for action had arrived.

The preliminary bombardment of Peleliu began with the heavy rumble of battleship guns. Flames lightened the glassy surface of a calm sea as the first light of day outlined the ridges of Peleliu to the east. From our transports, the assembled fleet appeared as a black mass spread upon the horizon.

By 0600 the waters of the transport areas were churned by hundreds of landing craft and amphibious vehicles, and the naval barrage had settled to a steady pounding from all sides of the beleaguered island. Marines moving steadily closer to the line of departure were treated to a mounting spectacle of destruction.

The division plan of attack called for the landing of three regiments abreast upon the island's southwest beaches immediately adjacent to the Peleliu airfield. The lineup of combat teams was one long familiar in the battles of the Pacific: on the left flank, the First Marines, with two battalions abreast; in the center, the Fifth Marines, two battalions abreast; and on the right flank, the Seventh Marines, with two battalions in column. The Second Battalion, Seventh Marines, was held originally in division reserves; the support battalions of the First and Fifth Marines were in landing craft immediately behind the assault teams of their respective regiments, prepared to land on call.

The scheme of maneuver was not simple. On the right, the Seventh Marines would


PELELIU ISLAND
IN THE
PALAU GROUP
KONGAURU
3
5
AIRFIELD
NGESEBUS I.
JAP
AMPHIBIOUS
ATTACK D+9
REEF
RIDGE
NGABAD
BLOODY
NOSE
ARMY INFANTRY
REGIMENT FROM
81ST DIVISION
D+8
1ST MARINES
5TH MARINES
7TH MARINES
INITIAL ACTION
SUBSEQUENT ACTION
1000 YARDS
(APPROX)
1235

drive straight across the island and then move south to clean out the enemy thus cut off from the upper end of Peleliu. The Fifth Marines had the task of seizing the airfield and then swinging north to advance up the right half of the island as the First Marines moved up on the left.

By 0800 the intensity of bombardment had reached a climax of fury. Flame and smoke obscured the island and bellowed upward thousands of feet into the clear blue sky where great formations of planes circled and dived to drop their bomb loads, launch their rockets, and strafe the enemy position. From ships close to the reef, barrages of rockets and mortars were launched in vast numbers.

Shortly after 0800 the first wave of armored amphibians ground over the shelving reef and started across the shallow 500-yard coral shelf toward the beaches of Peleliu—and into the fire of the enemy.

The battle had started, there on the reef.

The armored amphibians were engaged immediately by Jap antiboat batteries and mortars. Hindered by obstacles and slowed by barbed-wire entanglements, the armored assault wave fought a running battle onward to the heavily mined beach. The beach was made shortly before H-hour, 0830, as scheduled, and the amphibians were met by the murderous fire of high velocity guns and large-caliber mortars. The white sands soon were cluttered with burning and exploding amphibians.

Assault infantry companies piling upon the beach from amphibian tractors found themselves pinned down by a devastating hail of high explosives and machine-gun fire. The reef was dotted with Marines wading from their burning tractors toward the beach.

Many did not reach the sand—they lay where they fell.

Before the assault platoons could worm their way inland through the mine field, successive waves of Marines hit the beach and piled up in the sand and water where they lay stunned by the violence of the struggle. The heavy destruction of amphibians broke up landing groups and scattered companies over many beaches.

Gradually, however, small units pushed ahead through rows of mines—mines with trip wires connected to fuzes hidden in the sand. Platoons and companies reorganized hastily to continue the attack inland from the deadly beaches as enemy fire grew steadily in quantity and accuracy—particularly in the First and Fifth Marines area. Although the Seventh Marines were successful in penetrating the area south of the airfield, a tremendous blockhouse of reinforced concrete built into the side of a rocky island just off the right flank of our beach continued to knock out tractors and cut down Marines with devastating enfilade fire. In the gap between the First and Fifth Regiments, a heavy system of pillboxes spit death at both combat teams.

The naval barrage, now lifted to the high ground commanding the beachhead, failed to silence the Jap mortars or spoil their aim. Fighting was fierce and progress very slow on all fronts.

By 1000 the reef and beach were cluttered with burning vehicles and discarded equipment. The division front was a ragged line—some places but fifty yards inland—of dubious location and doubtful strength. Jap 155-mm mortars, with astonishing accuracy, settled down to a steady barrage. Small but repeated enemy counterattacks began to batter the lines at many points in an obvious effort to locate weak points. Snipers were everywhere. Bypassed pillboxes continued to harass troops from unexpected directions. The assault was far behind schedule—perilously so.

The orders had been to penetrate to the line O_1, about four hundred yards inland, immediately upon landing, reorganize, and then advance across the field to seize O_2. By mid-afternoon, however, the division barely held the fringe of shattered trees between the airfield and the beach. Instead of abating, the fighting increased in violence until, by 1630, the Japanese attack developed into a full-scale, tank-led assault.

The main force of the enemy attack struck the First and Fifth Marines, and simultaneously a smaller attack hit the Seventh Marines. The first wave of Jap medium tanks crashed through the Marine lines and headed for the beach. However, when Jap infantry riding the tanks and following on foot were mowed down by Marine small-arms fire, the tanks swerved and headed south along the lines, their machine guns and cannons spurting death. Three tanks were destroyed by bazookas and grenades in rear of the First Battalion, Fifth Marines—one tank just in the act of firing point-blank into the shore-party evacuation station.

Reorganizing rapidly with another wave of tanks, the Jap attack continued on a wide front until, at the edge of the airfield, our medium tanks poured through the Marine lines and engaged the enemy forces in a violent duel at the center of the beachhead. The Jap tanks converged upon our General Shermans and for a while smoke and flame and the roar of gunfire drowned out the excited cursing of the Marines and the howling of the Japs.

When the smoke cleared and the sound of battle lessened, the wreckage of a dozen enemy tanks burned along the Marine lines. The Japs, withdrawing to positions north and east of the airfield, left a route littered with their dead. The feeling of relief was unmistakable in the shell holes and antitank trenches where front-line companies had fought stubbornly for ten hours to hold on.

The Jap covered his withdrawal by a barrage of mortar fire which continued to fall throughout the night and seriously hindered the progress of unloading. As darkness fell, the scarred landscape was bathed in the brilliant glare of flares which enabled the Marines to fight off numerous small infiltrating attacks during the night.

At the end of the first bloody day on Peleliu, only a small part of division and corps artillery had been able to get ashore due to conditions on the beach. Those batteries which were firing had set up just off the sand in the midst of the infantry, and were harassed by snipers and the destructive counterbattery fire of Jap mortars.

The Second Battalion, Seventh Marines, landing during the night, had difficulty getting ashore—Jap mortars were hitting tractors on the reef.

At 0500 on D plus 1, after a night of costly skirmishes, the enemy launched a heavy attack into the First and Fifth Marines. Rifle and machine-gun fire roared along the entire front. Artillery and mortars jumped into sudden action. Tanks joined the fray. For hours the airfield area shook with the sound of gunfire. Behind the front, the beachhead was so raked with bullets and explosives that activity virtually came to a standstill.

Not only did the enemy fail to break the Marines' lines, but a counterattack was launched which drove back the Japanese. Behind a line of tanks, the First and Second Battalions of the Fifth Marines charged across the airfield through a hail of mortar fire and, before the enemy could recover, established a line in the hangar area north of the field. At the same time, the First Marines on the left forced their way into the main building area of the air station, fighting grimly through the rubble and heavy bomb-proof structures. The Third Battalion, Fifth Marines, and the Third Battalion, Seventh Marines, pushed slowly eastward across the island south of the field—at that point about a thousand yards wide.

The second day on Peleliu was as bad as the first. With the toll of dead and wounded soaring, Marines attacked incessantly to wrest small gains from an enemy who fought fanatically every foot of the way. On the southern end, the Seventh Marines slowly drove the Japs out on two hilly peninsulas, capturing many blockhouses, bunkers, heavy artillery pieces, and searchlights, and slaughtering hundreds of the enemy. Above the airfield on the right, the Fifth Marines made steady, slow progress; but to the left, the First Marines battled desperately throughout the day on the first slopes of the ridge dominating Peleliu airstrip.

By 1500 on 18 September (D plus 3) the

Seventh Marines had cleared out the southern end of the island. But even on the last day of that fight, a battalion of 155-mm howitzers going into position near the southern tip were forced to reverse their direction of fire and deliver point-blank barrages on the Japs at ranges between 300 and 500 yards. Battery G, Eleventh Marines, was fighting as infantry after they lost their guns to Jap mortar fire, which had been extremely effective.

The advance northward of the First and Fifth Marines was slow and costly. On D plus 4, the Fifth captured the Jap naval headquarters at Ngardololok with its radio direction finder station and surrounding artillery and antiaircraft positions. The command post of the Fifth then displaced forward from the airfield and occupied the heavy concrete barracks of the enemy. The ornamental gates, rock gardens, and goldfish ponds of the Japanese crumbled and vanished under the steady grind of American tanks and trucks. From Ngardololok, the Fifth moved rapidly to destroy remnants of the Jap garrison trapped in the small islands and mangrove swamps which comprised the eastern leg of Peleliu.

On the left, the four-mile-long ridge of the western leg of Peleliu proved to be an obstacle of unexpected magnitude. Along this commanding terrain feature, rising 200 feet above the coastal roads, the Jap had concentrated his heaviest defenses. Antiboat guns, withdrawn from beach bunkers, now held positions in depth along the routes of approach. Improving upon deep caves by constructing tremendous pillboxes of concrete and steel, the enemy held out against the fire of battleships and the massed artillery of corps and division.

Only by direct assault with flame throwers and demolitions could these positions be taken. And into this hell moved the Marine with his rifle—and guts!

Bloody Nose it was called—that first thousand yards of the ridge which ran the length of the western peninsula of Peleliu. It is a name which, to men who fought there, must always represent the maximum in death and violence. To the First Division, the memory of Guadalcanal's Bloody Ridge faded to nothing before the stark pillbox-studded horror of Bloody Nose and the ridges behind it.

For six days under a blistering sun the First Marines battled for Bloody Nose to the constant accompaniment of artillery and naval barrages, dive bombers, and rockets. Two-thirds of the regiment fell in battle. But the objective was taken—the harassed beaches were freed from direct artillery observation.

On the third day of the battle, the Second Battalion of the Seventh had been committed on the ridge, and finally the entire Seventh Marines moved into the sector. The First Marines, decimated by ruinous casualties, clung to the shattered cliffs just short of the line O_2. On the east side of the ridge, the Umurbrogal Mountain strongpoint held out against every Marine effort to storm its slopes.

The ridge was pounded day and night by terrific concentrations of artillery and bombs until the entire length of the peninsula was an ugly, naked nightmare of smoldering rock. Medium tanks were utilized in large numbers—wherever there was room. Often when a tank was disabled by Jap guns, a heavy mortar barrage would follow up—sometimes destroying the tank and its crew.

Finally, on 23 September, a regiment of the 81st Division was moved to Peleliu from Angaur, where resistance had been light. The infantry regiment was immediately committed on the western side of the ridge, where it relieved the exhausted First Marines. The First Marines pulled back into a defensive sector behind the Fifth Marines.

The fresh troops of this Army infantry regiment moved north along the coastal road for over a thousand yards and then struck the ridge from the west—but the Japs held. From positions high on the hills, the enemy swept the main road with bullets and mortars to complicate the traffic and supply problem.

The confidence of the Japs in their ability to hold this fortress was demonstrated on the night of 24 September, when barges from the northern Palaus came down through the

lagoon and attempted to land reinforcements on Peleliu. When flares revealed the fleet of barges, nine were destroyed by artillery and the direct fire of armored amphibians in the Fifth Marines sector. Several hundred troops, however, were landed on the northern tip of the island.

The strategy now evolved consisted of pushing rapidly northward along the western coastal road, with holding forces on the ridge, and then striking across the peninsula at weak points to sever the Jap line of communications and isolate the enemy forces in pockets. Accordingly, at 1130 on 25 September (D plus 10) the Fifth Marines received sudden orders to pull back from their right-flank position, pass around Bloody Nose, move up through the Army infantry regiment, and attack north toward the series of sharp hills which marked the tip of the island.

At 1230 the forward echelon of the Fifth Marines reached the command post of the Army regiment. The regiment moved out immediately along a road bordered with mines and harassed by snipers.

The rapid maneuvers and hard-hitting assaults of the Fifth Marines during the next five days stand out as a remarkable example of magnificent teamwork and sheer courage and spirit. In a series of sledge-hammer blows and flanking movements the regiment rolled down the peninsula, striking out to assault and seize key hills of the ridge before the enemy could fully register his remaining mortars. The fighting flared with a violence as sustained as the early assault days. The Jap struck back with antitank guns and mortar barrages. At night, frenzied banzai attacks penetrated the lines.

Marine tanks were everywhere—and they too suffered casualties. Flame throwers and high explosives scorched and blasted the coral ridges. From Bloody Nose north, the torn mass became known as Suicide Ridge.

By 27 September the great bomb-proof radio station and phosphate refinery were seized and intense fighting was in progress on the hills controlling the causeway to Ngesebus Island. From Ngesebus, Jap mortars supported their besieged comrades on the tip of Peleliu. The enemy fought like cornered animals from their caves and pillboxes. Two tanks were knocked out trying to round the point of the island.

At 0600, 28 September (D plus 13), warships began blasting the defenses of Ngesebus just 500 yards away. Marine artillery began a systematic barrage on the island and its adjoining isle of Kongauru. On the beaches opposite Ngesebus the Third Battalion, Fifth Marines, posed for the assault. In the hills around them, fighting broke out.

At 0900 the first wave of armored amphibians struck Ngesebus—and behind them came the rifle companies. Thirty tanks waded along in the rear. All day the Third Battalion, Fifth Marines, fought the defenders of Ngesebus, and as the sun sank, the airfield was captured and the last caves were being blasted shut. Four hundred Japs lay dead.

During the day, the Second Battalion forced the tip of Peleliu and cut back along the eastern flank of the ridge to attack the last Jap stronghold on steep Radar Hill. The end was near.

On 29 September, Peleliu was in the hands of the Marines except for several isolated pockets of resistance. These strongpoints were destined to hold out for days. The fire of 155-mm guns, the blast of thousand-pound bombs, and the heroism of thousands of Marines yet would be required to reduce pockets like deadly Umurbrogal Mountain.

Over 11,000 Japanese dead within the crowded defenses of Peleliu gave mute testimony to the violence which marked its conquest.

The art of war lies in calculating the odds very closely to begin with, and then adding exactly, almost mathematically, the factors of chance.

—Napoleon

Latin America at Leavenworth

LIEUTENANT RAFAEL MONTILLA, *Aide de Camp*
Command and General Staff School

IN the classrooms, mess halls, administrative establishments, living quarters at the Command and General Staff School—in short, everywhere student officers congregate—one sees a variety of different uniforms and hears languages unlike his own. This international atmosphere originates with the presence of officer students from many of the Allied nations. The newest addition to this atmosphere is the growing number of student officers from the armed forces of the Latin American republics.

Latin American officers, above the rank of Second Lieutenant, are enabled to attend the Command and General Staff School in greater numbers as the result of a new military educational project. This program was initiated some nine months ago by the Commandant of the school. Prior to entrance in the regular courses, these students attend a three-week pre-course. During this period, emphasis is placed upon English and fundamental military subjects.

First, the pre-course provides the Spanish- or Portuguese-speaking student with the ability to maintain a conversation in English and to attune his ear to spoken English so that he may understand the instruction given in the General Staff Course. The second objective is attained by giving the student officer a preliminary working knowledge of United States military terms, abbreviations, symbols, the composition of the United States Armed Forces, the duties of general staff officers, and the instructional methods employed at the school.

In order to realize the aforementioned aims in the brief period of time available, specially trained officer instructors and noncommissioned officer assistants have been provided. These specialists speak Spanish or Portuguese, as well as English, and are acquainted with the subject matter presented in the General Staff Course. They meet the Latin American officers upon their arrival at Fort Leavenworth and assist them with all administrative details, such as registration, assignment of quarters, procurement of personal baggage, and financial matters.

Previous to the opening of the preparatory course, separate classrooms have been set aside for the Spanish- and Portuguese-speaking students, and instructional material, in the form of directives, circulars, pamphlets, and manuals, has been translated into the two languages.

The teaching of English which takes place during the Pre-General Staff Course has been received enthusiastically by the students. Interest-creating situations and the repetition of commonly-used English expressions are the keynote. The text employed is easily comprehended. On each page of the text are printed three columns. The left-hand column contains sentences, phrases, or individual words in the language of the student; while the center column indicates phonetically the pronunciation of the English set forth in the right-hand column.

The Latin American frequently experiences difficulty in mastering the pronunciation of English words containing the letters *ee*, *oo*, *ou*, and *th*. Since the instructor is familiar with both languages, he is on the alert for such verbal hazards and corrects much mispronunciation at the outset. In addition, record players and English language disks are placed in the students' quarters, so that they may practice English at their leisure. All of the language materials were developed with the cooperation of the Language Section, Army Information and Educational Division, Army Service Forces.

Instruction in subjects of a military nature is conducted in English by instructors from the General Staff Course. The language specialists are on hand to interpret the presentations, wholly or in part, and to interpret any questions the student desires to ask in his native tongue. Questions are normally few in number, since the student has an opportunity to read the text of the conferences before they are presented in the

classroom. The instruction covers much of the matter that will be studied during the regular ten-week course; many of the same films, slides, charts, manuals, and handbooks are used, thus giving the Latin American officer a true preview of the General Staff Course.

In this manner the Latin American officer is prepared for the "high-geared" type of instruction with which he is confronted in the General Staff Course. Only three weeks before, he may have lacked the knowledge of English necessary for the successful completion of one of the most rigorous of the various courses given in the United States military schools. As a result, he is neither a spectator nor an observer merely being exposed to instruction; but rather he is a qualified candidate, judged along the same lines as his brothers in arms.

Upon entering the ten-week course, he still finds it difficult to understand the rapid-fire manner of speaking of some of the instructors. Of course, it bewilders him to listen to a fifty-minute conference presented in a "Southern drawl," followed almost immediately by a conference conducted by an instructor possessing a "down East" accent. Not all North Americans speak alike, just as not all Latin Americans speak in the same manner. Despite all the individual peculiarities of speech, the Latin American student manages to meet all of the major requirements of the Command and General Staff School.

As the ten-week course progresses, the bilingual personnel are needed less frequently by the students, although they are still to be found in a predetermined place in the huge classrooms and may be consulted by the students when necessary. These language specialists keep abreast of the instruction as it is presented and are available for helping the students at night study periods. This night study is accomplished at a conveniently situated study hall. The language personnel are present for at least an hour and discuss with the students the instruction received during the day and the assignments for the coming day, and any extracurricular problems which may have arisen are analyzed and normally solved satisfactorily.

During the preparatory course the Latin American students are quartered together, but with the beginning of the regular ten-week General Staff Course each Latin American officer is reassigned to an apartment containing about six officers from other nations. In such environment, the Latin American officer has ample opportunity to become more proficient in English; and as his knowledge of English increases, he is able to finish the required schoolwork in less time. This affords him leisure time in which to cultivate the friendship of his classmates and to attend the Post Theater, an excellent place to improve his oral recognition of English. He finds time to meet the members of the Staff and Faculty in their homes and at the Officers' Club. At the occasional social functions, he is capable of conversing with English-speaking officers and their families. He has become acquainted with a new language and does not hesitate to use it.

It has been the writer's privilege to be in daily contact with the Latin American students since the inception of this new military educational project nine months ago. Their individual reactions and their quick assimilation of the instruction speak loudly for the success of the project.

Like all new projects, it may be some time before the final results and accomplishments can be measured, but a better mutual understanding between our armed forces and our modes of life is bound to occur. The officers from Latin America who have already attended the thirteen-week course at the Command and General Staff School have learned our methods of work, and have left with us a true appreciation of the Latin American countries, their cultures, customs, and military knowledge.

It is a new plan, designed for the better understanding and the interchange of ideas between young, energetic military men of young, energetic nations, and should, during the years to come, result in an exchange of military students by the United States and the Latin American republics with mutual value for all of the nations involved.

Amphibious Warfare and the Naval Covering Force

CAPTAIN MILES R. BROWNING, *United States Navy*
Instructor, Command and General Staff School

WORLD War II has focused American military thought on the peculiar problems of amphibious warfare. Action in the Pacific theater has presented an unbroken series of demonstrations of overseas assaults both by the Japanese in their 1942 blitzkrieg and by the United Nations in their counter-offensive which began at Guadalcanal.

The United States, of all great powers, is under the most compelling necessity for understanding and perfecting the technique of overseas warfare. Since 1814, except for the incidents of the Mexican War and our Civil War in 1861-65, United States continental soil has not known a hostile footprint. We are too powerful to be seriously menaced by attack from any country or combination in the Western Hemisphere. Our benign foreign policy toward our hemisphere neighbors eliminates possibility of aggression by us. War—if and when it comes again to our nation—must come from overseas. The corollary is obvious; to keep it away from our homeland, we must meet and throttle it at the far shore. Every thinking American recognizes this truth in some form, perhaps subconsciously. When America fights it must and will be on the oceans and across the oceans—not here!

The Navy and the United States Marine Corps have long been cognizant of the vital need for emphasis on amphibious training. For over twenty years the eyes of the Navy have been turned toward the growing menace of the Empire of the Rising Sun. Our fleet strength has been massed in the Pacific since 1919; our war games and our training have centered in the vast water areas to the west. And our Marine Corps, pitifully small though it was, during the peace years from 1919 to 1941 continued doggedly its unbroken effort to develop landing craft and equipment and beach assault technique.

The Army during this period, its eyes turned toward the European cauldron, stressed development of material and tactics of land warfare: armored columns, land assault on strongpoints, flanking maneuvers, etc. No one could have foreseen the amazing Nazi blitz which left the United Nations without a single usable beachhead on the European continent when the United States entered the conflict. Unlike World War I, when, in 1917-18, we had uninterrupted access to the ports of France and Italy, in this conflict we had to fight our way to and across the beaches before we could come to grips with the Axis armies. War in Europe had suddenly become amphibious war. The problems were those of the Pacific over again; fewer inter-island jumps, to be sure, but overall distances were far less; landings on a greater scale, perhaps, but the technique and the equipment were precisely the same.

So, suddenly and painfully, the great lesson has been brought home to America: *the first requirement of American military might must be that our forces, all of them, be expert in amphibious warfare.* From this premise, now unassailably established, flows the obvious precept that our military forces must meet on a far broader footing of mutual understanding than was formerly the case. There is no question but that this precept is clearly perceived and respected throughout the services. Training courses, schools, indoctrination centers, be they Army, Navy, or Marine, without exception, now incorporate in their conditioning of personnel and units a vastly increased measure of understanding and respect for the other arms. Inter-service liaison has prospered tremendously; this anemic stepchild of some years back has become the favorite son, and the services now vie with each other to claim paternity and furnish support.

It is in the line of this healthy and increasing interchange that many Army officers have inquired as to the nature and the functions of a naval covering force.

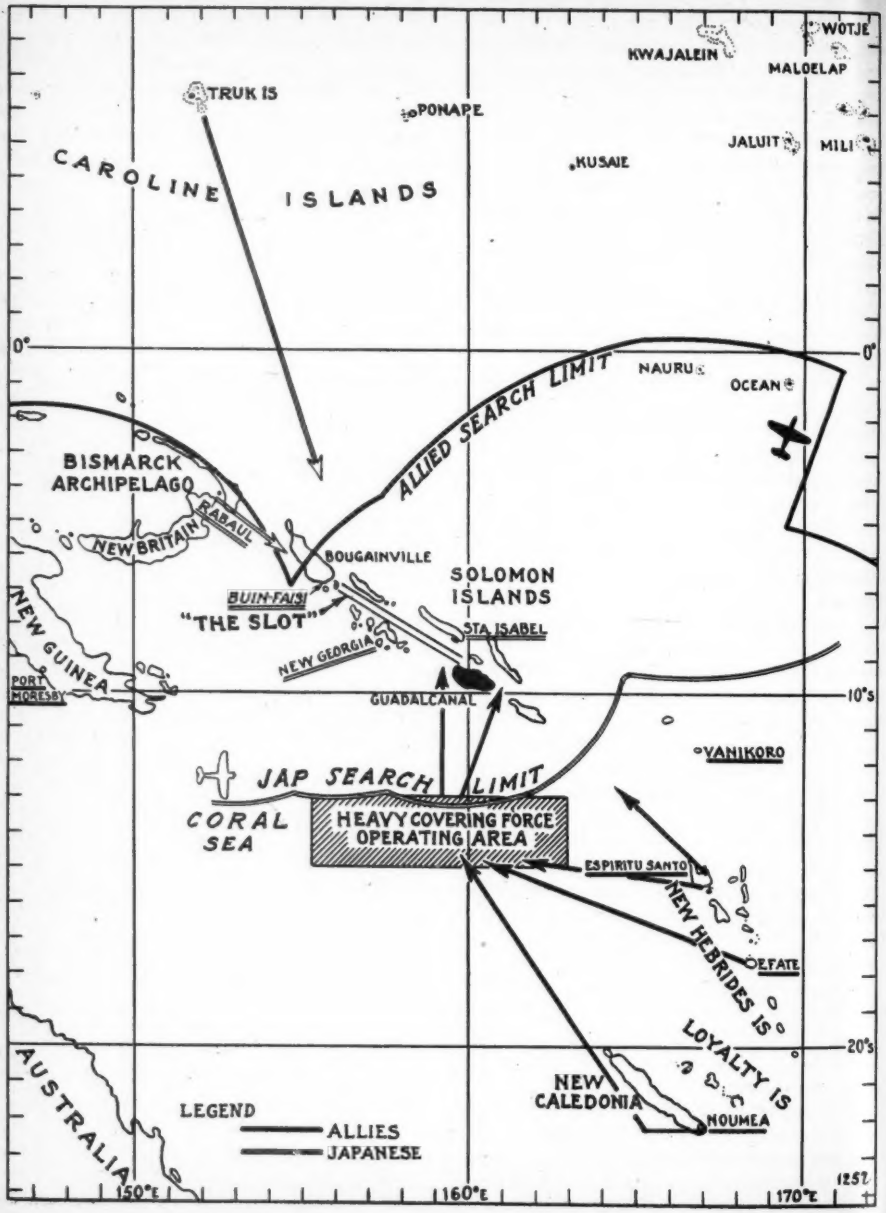
Amphibious warfare comprises two main features: movement overseas to the objective, and assault upon the enemy position, launched from waterborne bases. Any amphibious operation requires cover to prevent enemy interference and disruption; this cover is indispensable, both during the movement and during the assault. *Cover*, in this sense, may be best understood as a relatively distant function. It should not be confused with *escort* which is a close function, intimately and physically tied in with the overseas convoy movement. Neither should it be confounded with *direct support* which is a specific activity of the assault and tied directly to it in a relationship as close and immediate as that between convoy and escort. It will be understood, of course, that the same elements can furnish both cover and support; but *not* simultaneously. Support is positive in purpose—it seeks to reduce and drive out enemy resistance; cover is passive in purpose—it aims at blocking enemy interference and reinforcement or counterattack from the outside.

Note that, while passive in its *purpose*, cover may, and normally will, be offensive in its tactics. A covering force, to perform its function properly, should be strong enough to defeat any expectable enemy thrust. While there are many examples of the use of naval covering forces of inadequate strength in the early months of our Pacific war, these were recognized at the time as undesirable and costly risks whose acceptance was forced upon us by our lack of overall strength. An adequate covering force is one which can not only frustrate the enemy's attack or movement, but can also destroy him if he comes to grips.

Efficient sea search and reconnaissance are a *sine qua non* of effective cover. Enemy bases from which he can launch a striking force must be kept under constant surveillance if they are within range of our aircraft. Air patrol of sea lanes leading to the area of the assault is essential. Depending upon the geography of the area of the objective and the positions of enemy bases adjacent thereto, the naval covering force must operate in such position that time and space factors will permit it to *intercept*. The high mobility of the force, combined with the effective flow of reconnaissance information, permits its operations along interior lines relative to those of the enemy. Unless this principle is adhered to, the covering force will fail in its mission.

During the fall of 1942 our operations in the Solomons provided a classic example of the employment of naval covering forces (see sketch). The same tactics have been used in every advance we have made toward the Philippines and Tokyo. We have grown stronger and, consequently, have had to take fewer risks as time went on; but our covering forces at Tarawa, Kwajalein, Saipan, Guam, Hollandia, and Leyte have all conformed to the sound principles illustrated in the Guadalcanal campaign. From August to the end of the year, Guadalcanal was severely contested. Our hold on the island comprised a small area enclosing Henderson Field and a relatively narrow beach strip. Supply of our troops and aircraft was a hand-to-mouth affair with shortage of aviation gasoline, particularly, an ever-present and critical factor. The landing of troops and supplies was always in the face of enemy attack; air from his bases in the upper Solomons, artillery from his positions on Guadalcanal, and, most important and menacing of all, his fast naval thrusts down "the slot." These latter he employed repeatedly and daringly. Their missions were to break up our supply to our meagerly equipped forces on the island; to bombard our positions, particularly Henderson Field; and to bring in reinforcement and supply to their own troops. The waters in and around Guadalcanal were in dispute just as was the island itself; it may properly be said that during those trying months Guadalcanal was a continuing amphibious assault operation in which the amphibious combat phase had not been completed.

The United Nations' nearest advanced base was at Espiritu Santo in the New Hebrides and 600 miles southeast of Guadalcanal. The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Jap's nearest base was at Buin-Faisi on the southern end of Bougainville; however, he had an advanced air field at Munda in New Georgia, a seaplane operating point at Rekata on Santa Isabel, and barge and supply staging points throughout the entire island chain. His air search and reconnaissance activities extended south to about 13°S latitude, and he was able to obtain early information of our shipping movements headed for Guadalcanal. On our part, our long-range air search and reconnaissance could not be shifted from Espiritu Santo to Guadalcanal due to lack of fuel and supplies at Henderson Field. We could and did operate shorter reconnaissance and scouting missions to a range of some 300 miles from Henderson, and the many anchorages in the Buin-Faisi area were included in these flights. From Espiritu, our long-range searches covered the sea lanes to the northeast of the Solomons chain. Range of this search was extended somewhat by establishment of a seaplane tender at Vanikoro Island to the north, and staging Catalinas through that point. The Fifth Air Force of the SWPA Command kept us informed of results of their surveillance of Rabaul and the enemy bases in the Bismarck Archipelago.

The Jap practice was to stage his "Tokyo Express" and raiding runs through the Buin-Faisi area, departing from there shortly after noon and making a high-speed run down "the slot" to arrive off Guadalcanal between midnight and 0200. Our biggest headache lay in the difficult task of intercepting him. We did not have enough strength to maintain adequate covering forces at sea in a position to cut him off at any time. Most of our heavy ships were necessarily based at Noumea, since the facilities at Espiritu were barely adequate to support the escort and cargo shipping which had to be packed into it. Whenever reconnaissance indicated an unwonted concentration of men-of-war in Rabaul or Bougainville ports, it was imperative that we place a sufficient force at sea in a position to intercept the Jap before he could reach Guadalcanal. Furthermore, from his major base at Truk, 700 miles due north of Rabaul, the enemy could (and frequently did) sortie with his heavy fleet elements comprising carrier and battleship strength superior to what we could muster in the theater at that time. The persistent east-west weather fronts which lay along the parallel 5°S to 8°S latitude further hampered our reconnaissance patrols.

The Jap had little difficulty in ascertaining and plotting our schedules of air patrols; the areas were so extensive and the available aircraft so few that there was practically no chance to vary their routes and times. Based on his knowledge of when and where our scouts would appear, and employing the weather screen to the maximum, his sorties were so timed as to deny our discovery of them until the latest possible moment. During the later stages of the Solomons campaign, when extensive use of Black Cats from bases farther forward provided improved night search and reconnaissance, we were able to pick up his "Express runs" more promptly; but in the first few months we were compelled to rely on daylight reconnaissance, plus deduction, for our information. Many cases occurred during that period when major sorties from Truk were undiscovered until they were inside of 300 miles from Guadalcanal, and minor runs down "the slot" were not discovered until they were half way to Guadalcanal.

To meet the ever-present threat, we were forced to subject the combatant ships of the South Pacific to a gruelling and vicious existence of practically unbroken sea-keeping. Forces comprising cruisers and destroyers were operated out of Espiritu and generally along the line from that base to Guadalcanal. Heavy task forces, based in Noumea (and later at Efate) were operated in the sea area generally south of Guadalcanal and between 15°S and 13°S. These forces were kept at sea for many weeks at a time, operating in tropical waters with the attendant wear and tear on machinery and personnel, constantly under threat of enemy submarine and air attack, and alerted twenty-four hours a day for instant maximum speed runs to intercept.

In its essence, the plan of operation for these covering forces was to maintain them as close as possible to the enemy approach

routes while preventing their discovery by enemy scouts. Absolute radio silence was maintained at all times. Guadalcanal usually provided warnings of enemy search and attack flights in time for the covering forces to evade detection and attack by air. Henderson Field fighters served as a screen interposed between them and the enemy bases to the north. Their own carrier-based fighters destroyed the occasional snooper which got close.

At night, particularly when an "Express run" appeared likely, the forces—or cruiser and destroyer detachments from them—would head north to reach the vicinity of the northwestern tip of Guadalcanal shortly after midnight—just in case. If no run developed, these ships would retire at high speed during the remainder of the night, rejoining their main force the next forenoon.

The cost in maintenance of material and in health and welfare of the men was heavy. We suffered a few ships lost and damaged by submarine attack, and the *Chicago* lost by enemy air attack which got through to her. But the operations at Guadalcanal were covered; adequate supply and support reached our troops in ever-increasing quantities; and the back of the all-out Japanese attack of 12-14 November 1942 was broken by these same covering forces operating in and from the positions outlined above.

It is well to repeat that the pattern of employment for the covering forces during the long campaign in Guadalcanal is identical in principle with that followed in all our later assaults in the Pacific. As we have acquired increasing superiority in naval and air strength, our overseas assaults have increased in scale and achievement. The naval covering force has been, and will always be, a vital feature of this amphibious warfare. It comprises three simple essentials:

It must be strong enough.

It must be positioned to intercept.

It must be kept informed.

If these three precepts are abided by, the assault being covered will have every guarantee of freedom from outside interference; if they are violated, disaster will be warmly invited.

Ruse de Guerre

Extract from "This Is Your Enemy," an article in *Air Force* January 1945.

A HIGH-RANKING Allied officer, an observer on a bombing mission over Nazi Europe, was wounded and rendered unconscious when the plane was struck by enemy fire. Coming out of the coma, he found himself in a hospital. Around him were British-uniformed doctors and nurses. On a nearby table was a London newspaper.

One of the medics, identified by his insignia as a British colonel, explained that the flak-riddled bomber had managed to limp back across the Channel, only to crash near the English coast. He congratulated the observer on his narrow escape from death, adding, with a sigh, that all others aboard had been killed.

After asking the wounded officer routine questions concerning his unit and base, the colonel launched a conversation which revealed he was deeply interested in air operations. Not at all reluctant to discuss the subject with a fellow officer, the patient brought the doctor up to date on several phases of Allied strategy.

So expertly was the little drama staged that the invalid did not know until later that the "British" doctors, nurses, and newspaper all were props. His plane had crashed in German territory and he was in a prison hospital.

German Tactical Doctrines

MAJOR WARREN R. DAVISON, *Infantry*
Instructor, Command and General Staff School

THE purpose of this discussion of German tactics is to present some idea of the Germans, their tactical principles, and their methods of employing these principles on the battlefield. Throughout this discussion it must be realized that although the German is very methodical in his ways, he will, when he is pressed by necessity, such as a shortage of equipment, depart to a certain extent from his tactical doctrines.

A point which is well worth remembering when considering the German in combat is that he will accept any risk or any number of casualties in order to accomplish anything which is considered vital. The German does not expect always to give his soldier the same "fair fighting chance" that we do in our Army. The German soldier has been mentally conditioned to this throughout his training, and therefore he is willing to be sacrificed to a certain extent in the attempt to accomplish those things which are considered vital by his leaders.

With these points of their philosophy in mind, then, you cannot take the attitude that the Germans will not do a given thing because you would not ask your own troops to do it.

Among German ground forces, the purpose of reconnaissance is the same as ours —that of gaining early tactical information about the enemy. However, their organization for reconnaissance in all types of units, and the tactical principles employed, differ greatly from our principles. In general, German reconnaissance units are organized, armed, and equipped to fight for their information if necessary. In their Field Service Regulations there are statements to the effect that *"superiority in the reconnaissance zone is important for successful reconnaissance .... Advanced enemy security forces should be thrown back in order to obtain information about the enemy main forces."* Where terrain allows, their reconnaissance forces will be motorized, and will be used to go in advance of the main unit to seize and hold vital points. Another general point which they stress is personal reconnaissance by their commanders. They also stress the importance of close coordination between air and ground reconnaissance.

All of these are general principles which German reconnaissance follows, and it will be borne out by anyone who has been in combat against the Germans that they employ these principles with great vigor.

Methods of employment will differ with the type of unit. For example, in a typical infantry division, the reconnaissance battalion is composed mainly of a horse troop, a bicycle troop, and a heavy weapons troop. The light armored cars of the heavy weapons troop will normally lead, followed by cyclist patrols using the available roads and the cavalry patrols moving cross country. Heavy machine guns and mortars will be attached to these advance patrols and they will fight to accomplish their mission. The two 75-mm infantry howitzers which are organic to the heavy weapons troop will be used well forward to support the advance of the patrols. The remainder of the battalion will be held in a reserve position from which they can be used to influence the action.

The method of reconnaissance by panzer divisions is very similar. The light armored car company of the panzer reconnaissance battalion normally leads in patrols of two or three cars. These are not used offensively, however, but are used to scout out enemy positions.

Behind the armored car patrols are the armored reconnaissance companies composed of armored personnel carriers. Each company is normally supported by two heavy armored cars each mounting a 75-mm short-barrel tank gun.

The third armored reconnaissance company is normally held in reserve with such weapons of the armored heavy weapons company as have not already been decentralized.

Antitank guns will normally be attached

to the reconnaissance battalion and tanks are often added for additional drive.

Close battle reconnaissance is carried on by means of patrols and small "battle groups" composed of all arms, even though it does mean forfeiting surprise. Throughout Italy and on the Western Front, light tanks have been used to a great extent in this reconnaissance role as a part of these battle groups.

Enough for their principles of reconnaissance. Let us go on with a few general principles for the march.

German units will advance along as many routes as there are available. The organization of their flank guards and point does not differ materially from ours. Their advance guard normally consists of from one-sixth to one-third of their total strength. There are several characteristics worth noting, and one of these is that the Germans use their assault guns well forward to support their point. This principle sometimes leads those who are inexperienced with German tactics to believe that they are being hit by a force of much greater size than is actually facing them.

Another point well worth noting is that although German teachings stress the undesirability of dispersing their tank forces, more often than not tanks will form an advance point for a panzer division.

Along this same line it is appropriate to mention "mixed battle groups." German organization is such that down to and including platoons they are both administratively and tactically self-sufficient. This facilitates their ability to decentralize their troops to form these "mixed battle groups." This practice by the Germans has been prevalent throughout Italy and France and during the 16 December breakthrough. The small "mixed battle groups" are many times sent ahead in an advance to seize important features. They advance to their objective, depending upon speed, concentrated fire power, and surprise to break their way through. This concentration of effort with utter disregard for their flanks very often carries them through to their objective unless the defensive position is well organized. Once on its objective, this "mixed battle group" organizes an all-around defense and constitutes quite a disrupting force in its enemy's rear.

Most German marches are made at night in an attempt to gain surprise or for secrecy reasons. They will, however, move in daylight and have been doing it continually, and with quite some success, when the situation so demands.

In a discussion of German attack principles, the first which bears a great deal of recognition is that the Germans believe strongly in the element of surprise. In order to obtain surprise along the particular sector where they are going to attack, they make various feints and ruses on other parts of their front.

Through their use of close battle reconnaissance—that is, battle groups probing for the enemy's weak spot—they lose some of this element of surprise, but they are willing to accept this loss of complete surprise as to where the attack is to take place, and concentrate on getting surprise in some other way such as to the exact time the attack is to take place.

The offensive spirit has been inculcated into every German. German teachings state that "there is nothing so wrong as doing nothing," and therefore you must be prepared at all times for anything.

The Germans will avoid a frontal attack whenever possible, as they believe it is the costliest and requires more forces than any other type of attack. However, they will attack frontally if they cannot locate the flanks or are unable to encircle the position.

In any type of attack, however, the German concentrates his force at the vital point and will denude the other parts of his front if necessary in order to achieve this. The German build-up prior to the "16 December bulge" is a good illustration of this. The Germans withdrew from the Holland area four regular-employment infantry divisions, leaving nothing but limited-employment two-regiment defensive divisions in the inundated area to defend. From the Düren-Cologne area, they took four SS panzer divisions which had been VI Army reserve in that area and which

were the cream of the crop. They also denuded the V Panzer Army which was in reserve in the Cologne area and moved five of its panzer grenadier and panzer divisions south, concentrating all of these forces in the vicinity of Trier for the attempted breakthrough.

In the attack, the German believes in the destruction of the enemy with all possible means. However, his belief lies mainly in fire power, and therefore assault troops are heavily armed with automatic weapons and are closely supported by other arms. Their artillery on the whole will be placed well forward—assault artillery aiding the assault elements by direct observed fire, with other artillery components having the main mission of preventing the movement of enemy reserves to the threatened area.

In assaults, other than just local attacks, it has been found normally that the German will concentrate his initial ground efforts against his enemy's artillery positions, if possible, by bypassing the infantry positions or breaking through them and leaving these to be cared for by succeeding waves.

A reserve is always kept for the purpose of exploiting the success of the attack.

The employment of these attack principles will vary depending upon the type of unit making the attack. In major-scale attacks so far in this war, the Germans have generally used their panzer and panzer grenadier divisions as the assault elements, using the infantry divisions to hold the ground gained.

It might be best to treat panzer and panzer grenadier tactics together, as originally the panzer grenadier divisions were developed solely for the purpose of close cooperation with panzer divisions. However, it must be realized that either type of division can be used without the support of the other, and that very often panzer grenadier divisions are used alone, especially since the inclusion of a tank battalion as an organic part of the divisional organization.

Panzer divisions operating alone are generally used to attack an undeveloped position or force, to constitute a breakthrough, or to pursue a withdrawing enemy. When they are reinforced with panzer grenadiers or motorized infantry divisions, they are used to attack prepared defenses. Although German armored teachings emphasize the use of tanks in concentration, remember that they do decentralize.

In an attack by a panzer force, the tanks are normally concentrated in three waves. The Germans teach that the success of an armored attack such as this, depends upon concentration of effort and upon speed.

In this three-wave attack, normally on a narrow front, all three waves move off together, although the third wave may be delayed slightly. The first wave has the mission of breaking through to the artillery position. The second wave, accompanied by panzer grenadiers, assault artillery, and antitank artillery, has the mission of initially providing covering fire for the first wave, and then following it in to the infantry positions. The panzer grenadiers follow the tanks closely in their armored vehicles, and dismount as close to the point where they are to engage the enemy as possible. The third wave, also supported by panzer grenadiers, assault artillery, and antitank artillery, has the mission of mopping up.

A point which is particularly worth noting in panzer attacks is the close cooperation between the armor and the panzer grenadiers, which, incidentally, in most recent attacks has shown definite signs of being not up to earlier German standards. A second point is the close cooperation between ground and air units. Panzer divisions normally have their own aviation support consisting of reconnaissance aircraft and Stuka dive bombers. Targets are normally designated to air by use of smoke, and there is direct radio communication between the ground units and the planes in the air, making for very close support.

Antitank guns are used very boldly to screen German tank assembly areas prior to the actual attack; and from that time on, at any time the tanks get halted.

A fourth and final point to be noted in this

type of attack is the excellent speed of maintenance and of reconnaissance. This must be realized in order to prevent being surprised by their ability to carry on.

German armor attempts to avoid tank-versus-tank battles. Normally, their fire front in this type of action has been composed of panzer grenadiers, antitank guns, assault artillery, and some light tanks. These have attempted to take up position on commanding ground which is vital for the enemy to attack. Some tanks have then been sent forward to employ decoy tactics, but when attacked, these tanks have withdrawn through the fire front. The remainder of the German armor, in the meanwhile, has maneuvered in an attempt to attack the flanks of the enemy armor which is engaged with the fire front.

Infantry divisions are used in the attack under conditions which preclude the use of panzers or panzer grenadiers. For example, they are used initially to break through obstacles in river crossings, and to mop up systematically the ground which is won. Normally, the attacking force is organized into three groups—the first group having the mission of breaking into the position; the second, of enlarging the gap; and the third group, of exploiting any success.

It has been found that normally the Germans concentrate their supporting weapons, including their infantry guns, well forward under centralized control to support the attack initially, but that as the attack progresses they then decentralize control again.

Infiltration by night is used wherever possible prior to the actual attack, which normally begins with the first light of dawn.

Much emphasis is placed by the Germans on the infantry assault guns being kept well forward with the assault infantry groups to support them. The German training manual states that *"the assault guns must be the live wire of the attack."* It is also common practice to find five or so tanks operating directly with each company to form these so-called "mixed battle groups."

The main principles of German defensive tactics are practically the same as ours.

The Germans believe that *"defense functions chiefly through fire power,"* and the normal prepared defensive positions of the Germans are laid out with the idea of destroying the enemy by an increasing weight of fire power before he reaches the main battle position.

Another of the principles which they use is *"Offense is the best defense,"* and they follow this principle in practically every defensive situation by means of quick, violent counterattacks whenever their defense has been penetrated.

Their choice of ground for defense is based primarily upon good observation for artillery and infantry weapons in order to achieve maximum fire effect, and secondarily upon concealment for infantry, suitability for counterattack, and flank protection.

Prior to actual contact, German reconnaissance is continually active in an attempt to discover the enemy's intentions and in an effort to screen their own positions.

As for the actual organization of the defensive position itself, it has great depth and consists of mutually supporting localities manned by groups of all arms, which will fight and counterattack from their positions to the last, even after the attack has gone on past them. An example of this on a large scale has been the determined defense of the French seaports long after the Allied invasion forces had pushed on through France.

The Germans are very skilful in adapting their defensive layout to the ground. Their teachings have never favored a linear defense, nor do they favor it in the field.

Their normal defense is organized in depth. Numerous observation posts are laid out both in width and in depth, and a very detailed fire plan is worked out for all supporting weapons, in an effort to defend by fire power all vital features such as approaches to the defensive position and terrain features from which the enemy might gain observation.

A minimum use of manpower in the line and a maximum number held as a mobile counteroffensive force is, generally speaking, the aim of all German commanders.

A German defensive position normally consists of three main zones: First, *advanced positions* which have the mission of delaying the enemy's advance and causing him to deploy prematurely by holding vital road centers, points from which the enemy could gain observation, and points from which their own artillery observers can bring the enemy under fire early. These advanced positions are normally held by mobile forces such as the reconnaissance battalion of a division and are always under division control. They are located from 5,000 to 8,000 yards in front of the main battle belt.

The second zone consists of *battle outposts* which have all the missions associated with the advanced positions, plus deceiving the enemy as to the exact position of the main battle belt and preventing surprise.

Troops manning these battle outposts come from the units which are manning the main battle belt. These positions will normally have antitank guns supporting them and will be located from 2,000 to 3,000 yards in front of the main battle belt.

The *main battle belt* consists of a series of strongpoints, mined, wired, mutually supporting, and organized in depth. Each strongpoint is organized for all-around defense, is tank proof, and is stocked with ammunition and supplies so that it will be capable of holding out when bypassed by the enemy.

The size of these strongpoints will vary according to terrain, but the general tendency is towards company strongpoints, mutually supporting each other to form a battalion center of resistance, the battalion centers of resistance also mutually supporting each other.

In all defensive positions the greatest stress is laid by the Germans on maximum use of camouflage and cover, but they do not hesitate to sacrifice cover for fields of fire. Their teachings are that "sweat saves blood, and blood saved means another weapon capable of firing at the enemy."

In summary, the main principles of German defense are these: to destroy the enemy by an increasing weight of fire power before he can reach the main position; to organize positions so that they will be mutually supporting; to have every unit, no matter what size, hold a reserve with which to counterattack; to prepare each position for all-around defense so that it will hold out even though bypassed by the attack; and to prepare the overall defense position in depth.

In the defense, when time and troops are available, a rear position is organized. It is situated sufficiently far back to compel the enemy attacking the main position to move his artillery forward before he can support an attack on the rear position.

The Germans have been extremely adept throughout this war in their method of withdrawal, and at the same time, extremely thorough.

Actually, there are two types of withdrawals according to German teachings. The strategic type is withdrawal to a new main position before the enemy attacks. In this type of withdrawal they have plenty of time to carry out deceptive measures and demolitions. These demolitions are planned and carried out with great thoroughness and ingenuity. Anything which could possibly be of use to their enemy is either taken away or demolished, mines and booby traps are ingeniously placed, and all roads are cratered, bridges blown, and communications disrupted.

The second type of withdrawal, at which they are also very adept, is withdrawal when actual contact must be broken. They do this by thinning out their positions. While thinning out is taking place, every effort is made to deceive the enemy by maintaining the volume of fire. Their field guns especially are kept moving so as to fire from vacated positions. Mine fields and booby traps are laid to the full extent of the time available.

"Mixed battle groups" are formed to hold the rear-guard positions. These battle groups are kept mobile and include as many hard-hitting, long-range weapons as possible. Tiger tanks have been used to a great extent for this purpose.

If this withdrawal is necessary in daylight, the German will attempt to accomplish it by launching a very violent counterattack to

keep his enemy fully engaged while he himself is disengaging.

In a night withdrawal he merely packs up and takes off, leaving behind him his rear guard composed of mixed battle groups to cover him.

These few tactical principles and methods of application by the Germans are by no means a complete coverage of this field, but have been presented merely as a general background to an understanding of how the Germans operate in the field.

Notes on the Leyte Operation

Artillery Observation.—Effective observation was limited for the artillery in our attack on Leyte by the heavy vegetation. Without observer planes the artillery would have been almost completely blinded.

On the other hand, it was reported that the possibilities of ground observation were not completely exploited. Great emphasis having been placed on forward observing, the possibility of using good terrain somewhat farther back was overlooked. In one instance a 120-foot hill suitable for a ground observer's position was said not to have been used until the third day.

Corps artillery was allocated a section of the corps' photo-interpretation team, which is reported to have given invaluable assistance. This procedure enables the normal corps artillery to realize the full value of reconnaissance photos. This is particularly important when fighting the Japanese, because they are expert at camouflage.

It was suggested that at least one LST (landing ship, tank) should be set aside in the initial stages of landing for the purpose of launching an observer plane for immediate air-artillery liaison.

Reconnaissance.—One lesson of the operation was the importance of pioneer training for artillery reconnaissance troops. Engineers cannot always be available for this work. Another lesson was the need of early training in recognition of own and enemy's tanks and landing craft.

Survey.—When good terrain intelligence is available before the landing is made, the establishment of the Survey Plan, before the assault, will save time thereafter in massing the fires of division artillery. Experience indicated that as much as three days can be saved by close supervision of Survey Plans prior to the operation.

Combat Patrols.—The defense of command posts can be materially aided by properly-timed combat patrols sent out to flush and kill any enemy troops lurking within the radius favorable for night attacks against such installations. In one case on Leyte, patrols are reported to have been sent out within approximately a 500-yard radius of an artillery command post every day at 1800 for this purpose. The enemy made a practice of counterattacking immediately after dark. Our patrols were generally successful in killing off sufficient numbers to reduce the effects of enemy counterattacks. Our casualties are reported as low in these operations, and usually a large amount of equipment was captured.

Transportation.—The swampy condition of the ground favored tracked vehicles in preference to wheeled vehicles. There was a successful use of caribous by Filipinos to haul supplies from the beaches. Bulldozers were found extremely versatile, and, it was thought, would be of assistance if issued on the basis of one per unit down to and including the battery. The light cargo carrier M-29-C, known as the "Weasel," was valuable for messenger work and carrying casualties.

Shoulder Holsters.—The wearing of pistols day and night brought out the fact that the shoulder holsters as used by the Marines would be very useful, if issued in the Army.

Some Problems of a Communications Zone

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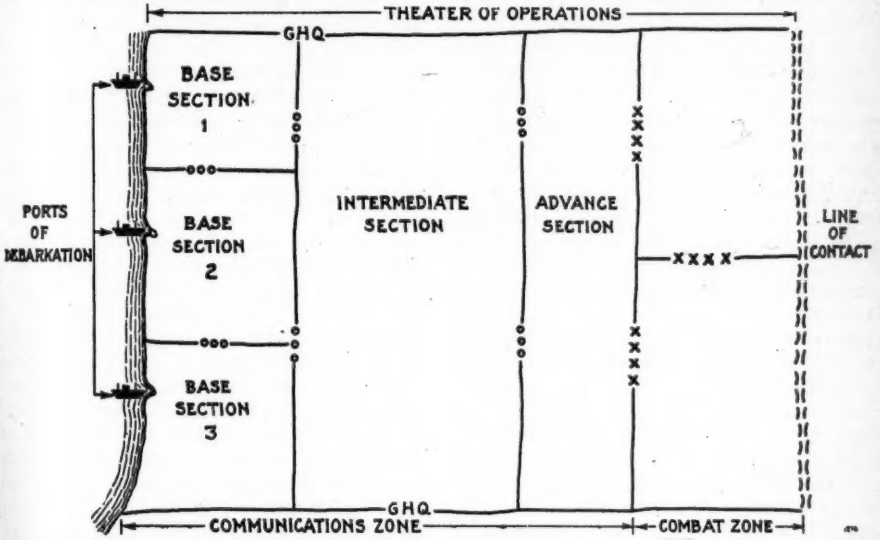
THE purpose of this article is to consider the varied and recurring operating problems encountered within a communications zone section, either base, intermediate, or advance. A typical communications zone organization will first be reviewed, and some a secondary mission of administering rear areas of the theater to facilitate the most effective and rapid destruction of enemy forces. In this capacity, it is concerned with civil affairs, defense, exploitation of resources, and details of "housekeeping" of the troops and



of the operating problems will then be discussed.

The communications zone is one of two geographical subdivisions of a theater of operations, the other being the combat zone. It is the connecting link in the chain of supply and evacuation between the zone of the interior (United States) and the combat forces which comprise the combat zone. Geographically, it is that portion of a theater of operations—land and water—not required by, nor under the control of, the combat forces. It has a primary mission of receiving supplies from the zone of the interior, storing them, forwarding them to the combat forces, and relieving the combat troops of administrative details such as the evacuation of personnel and matériel. The communications zone has installations under its jurisdiction or dependent upon it for supply and administrative services.

To accomplish its missions, the communications zone normally is divided into geographical sections for operations and control. These geographical sections which may be found within a communications zone are an advance section, an intermediate section, and base sections. In the order named, these sections are echeloned in depth from the combat zone to the rear boundary of the theater.

The above is the normal teaching as laid out in our FM 100-10; however, organization of the communications zone is adapted to the plan of operations and is based on actual conditions in the theater of operations. The communications zone, therefore, will not be

organized in the same manner in every theater of operations; each will present a different problem. For an example, the Mediterranean Theater of Operations at the time of writing has no communications zone headquarters as such. It is consolidated with the theater headquarters and only has several base sections operating, with a base section rendering direct support to the combat zone. With this explanation in mind, various sections will be discussed briefly.

The advance section is adjacent to the combat zone and may be considered as a relatively narrow band or strip of land extending across the rear of the armies which are engaging the enemy. It is primarily concerned with direct support of the armies, for whom it carries a balanced stock of supplies. It facilitates the forward movement of these supplies as they are required, and evacuates personnel and matériel from the combat zone rearward to the base sections. It should not be burdened with more territory or responsibilities than are necessary for it to accomplish its mission of rendering all-out support to the front-line forces.

An intermediate section usually will be found in a communications zone which is unduly elongated from the line of combat to the rear boundary of the theater. When activated, it would have a mission of administering the territory between the advance section and the base sections, and facilitating supply and evacuation within the communications zone in support of the advance section. Its internal supply and administration would be similar to those found within a base section.

The base sections, as the name implies, are the most static commands of a communications zone. Their primary mission consists of operating the ports of debarkation to receive supplies from the zone of the interior and evacuating personnel and matériel to the zone of the interior, storing such supplies to maintain the theater reserve, forwarding supplies to the advance section as required, and facilitating all administrative operations in support of the advance section. Secondary missions pertain to administering the territory comprising the section, defense, exploitation of resources, and many miscellaneous details concerned with housekeeping for the troops stationed within or passing through the section.

After a communications zone section has been in operation for a period of time, numerous recurring operations will develop and tend to become standardized. For example, supplies will begin to be consumed at a more or less constant rate resulting in shipments being made on a periodic basis. Major changes will be few and will consist principally of the absorption of additional territory and installations from the combat zone as the combat forces progress against the enemy.

Much has been said and written about the manner in which a communications zone will conduct operations in support of the forces in the combat zone. Likewise, information is available regarding the receipt and storage of supplies shipped from the zone of the interior to the communications zone and their subsequent movement to the combat zone. Little has been said of the smaller-scale, routine daily problems which confront a communications zone section. As previously stated, it is the purpose of this article to discuss a few of these problems and to present a method which has worked to standardize and control the supply and administrative procedures within a section of the communications zone.

Initially, communications zone section operations will be accomplished in the most expeditious manner to give effective support to the combat forces. During these early stages in its development, the proportion of troops and equipment available for accomplishing the many supply and administrative tasks will be more favorable than at a later date. At no time will it be likely that there will be a surplus of such troops and equipment. As greater tonnages of supplies are received from the zone of the interior, as greater numbers of personnel—casualties and prisoners of war—and quantities of matériel are evacuated, and as more troops are received into the theater, thus increasing the housekeeping responsibilities of the section,

the emphasis on operations must be transferred from emergency to systematic and efficient methods.

Two of the problems confronting a section are control of highway transportation, and supply distribution and evacuation within the section. These must be standardized and controlled as quickly as possible in order to obtain the most effective operations.

Transportation has been at a premium in all theaters of operations and undoubtedly will continue to be so. Railroads will be the backbone for handling the long and heavy movement of troops and supplies, but will not be in operation immediately. Even after railroads have assumed their normal share of the transportation burden, there will be gaps in the transportation system, due to the disposition of troops and to enemy action, which must be filled by motor transport. In addition to the transportation required to support the combat zone, a great volume of traffic will be found on highways for the internal administration of the sections of the communications zone. Thus, the effective utilization of motor transport and its control on congested highways are major responsibilities of the communications zone and the several sections.

The second problem that requires effective control within a section is a system for internal supply distribution. World War II is frequently called a "war of logistics." When referred to in this sense, one immediately thinks of the many problems incident to the procurement, storage, and movement of supplies within the United States, of the movement of supplies overseas, and their subsequent distribution and issue to the troops engaged in combat. Much has been written and said concerning the aforementioned aspects of logistics, and an efficient and adequate system is in operation today to accomplish the supply of combat troops, but little has been said in any of our military publications about the problem of "internal supply of the communications zone."

To review briefly the Army system of supply, distribution, and issue in both the zone of the interior and overseas, the Technical Services of the Army Service Forces, and the Army Air Forces, are charged with the design, procurement, storage, distribution, and issue of supplies and equipment within the zone of the interior. Designated depots of the several services of the Army Service Forces and of the Army Air Forces receive, store, and make bulk distribution of these supplies both to ports of embarkation for shipment overseas and to issuing agencies in the zone of the interior for so-called "retail distribution" to troops stationed within the United States.

The Army Service Forces, through the subordinate Service Commands in the United States, facilitate distribution and issue of supplies to troops through posts, camps, and stations which do the housekeeping for ground and service units. Thus, we see that within the United States, depots generally are concerned with bulk handling of supplies which they ship to a post, camp, or station where issue to the using troops is accomplished by the station complement.

Turning our attention to the overseas supply system, we find ports of debarkation of the communications zone receiving supplies from the zone of the interior which are moved to base depots, general or branch, for storage pending shipment to the depots in the advance section of the communications zone. Within the combat zone, the several armies operate army depots, railheads, and truckheads for the receipt, storage, and issue to the using units of supplies moved forward from the advance section depots. Within each tactical organization, troops are provided for the distribution and issue of supplies within the organization. Here again we find an adequate and efficient system for the supply of troops immediately engaged in combat.

To complete the entire supply picture, the matter of supply distribution and issue to troops and installations of the communications zone which are static, and to those troops entering, temporarily stationed within, or passing through the communications zone, must not be overlooked. While it is a relatively minor matter when compared to the "big picture" of supply, it is a problem which may seriously hamper supply to the front-

line units if it is not satisfactorily handled. Closely allied with the matter of supply distribution within the communications zone is the effective utilization of motor transportation.

Many expedients are in use overseas today to meet this problem. Depots frequently are charged with the supply of adjacent troop units and installations found within a communications zone. Since the primary mission of a depot is to handle supplies in "bulk" quantities, the "retail business" referred to here tends to hamper the depot in this primary mission. If such retail business has sufficient volume, the operation of the depot in furnishing supplies to units in combat may be seriously affected.

Other problems created when a depot has a volume of retail business are traffic control of motor vehicles and congestion on the roads in and about the depot. The most efficient system of scheduling units to draw supplies will not overcome limitations resulting from inadequate road network and road maintenance, attack by enemy bombers, and inefficient utilization of motor vehicles in view of gasoline shortages and limited vehicle maintenance.

A solution successfully used in one theater to the problem presented in the foregoing paragraphs is the establishment of supply points under the administrative control of general or branch depots. These are the local "retail outlets." The area of a communications zone section itself is subdivided into geographical subsections, with the size and shape dependent upon the highway network and the volume of troops to be served. Strategically located within each subsection would be a supply point with the ideal location being in the center of a network of secondary roads. All units and installations, air, ground, and service, whether located permanently within the subsection or passing through, accomplish their routine supply through this type outlet. By installing such a system for handling internal supply, traffic and movement control are greatly facilitated.

In addition to these two problems, others concerning administration and evacuation must be solved, such as payment of troops, hospitalization and medical care, laundry service, burials, shoe repair, and many others, and information concerning such operations must be disseminated to all concerned.

The phrase used in the preceding paragraph—"disseminated to all concerned"—directs attention to the use of documents of one sort or another to control the communications zone section operations. The troops and installations to whom this information is disseminated fall into several categories: troops and installations under the direct command of the section; troops that are resident or operating within the section but not under its command, such as air force units, naval units, and in some cases, defense forces under command of headquarters communications zone or other theater agency; combat units received through the ports en route through the section to the combat zone, who are dependent upon the section for supply and service; troops of Allied nations which may be stationed in or passing through the section. All such troops, whether or not under the direct command of the section, must be controlled and directed in their movement and day-to-day routine administrative details in order that the section may carry out efficiently its primary mission of supply and evacuation of the theater.

Military documents which can be used to obtain standardization and control are of several types. While all have points in their respective favor, each has its shortcomings. These are SOP's (Standing Operating Procedure), Letters of Instruction, and Administrative Orders. The first two of these types, namely SOP's and Letters of Instruction, are not too desirable since they normally cover only one particular policy or operation and are issued by any one of many offices. Thus, the problem of coordination by the issuing offices is difficult, and the recipient of such written instructions must maintain a very large file, accurately indexed, in order to obtain the complete picture of all policies and operations within the section.

The third type mentioned above—Administrative Orders—meets the problem satisfac-

torily. In form, it follows the general outline as given in Form 6, FM 101-5. The subparagraphs are modified to fit the situation. All general policies and other necessary data are incorporated in the main body of the order. It is most important that such a document be all-inclusive and contain information necessary for section troops and installations to know definitely their respective responsibilities and methods of operation. Also, sufficient information must be contained to enable those units entering, temporarily stationed in, or passing through the section to effect their administrative and supply activities.

In publishing these Administrative Orders, they generally are accompanied by an administrative map in order to conserve wordage and to give a clearer picture of the respective locations of the many communications zone installations located in the section. It is well to bear in mind that this type of Administrative Order will necessarily be more lengthy than its counterpart in a tactical organization where brevity is essential. When a major change is required, a complete new order should be published. By use of this type document, confusion will be greatly minimized, and the supply and administrative procedures within a section may be more effectively standardized and controlled.

New Tactics in Air Attack

From an article in *The Times* (London) 4 November 1944.

APART from the weight and persistency of the RAF night and day attacks, a feature of our air offensive has been the low rate of casualties among the bomber crews.

Taken over a long period, it is doubtful whether RAF casualties have amounted to one percent of the forces used, in spite of the fact that our air offensive is now on an unprecedented scale and is directed against a country whose defenses have had more experience than those of any other of combating large-scale air attacks.

The RAF's success in this constant battle of wits is attributable to the skill and ingenuity of our scientists, to the careful planning of tactics, and to the courage and determination of the bomber and pathfinder crews and other flyers who play a "behind the scenes" part in the attack. For some months now one special section of Bomber Command, known as the Bomber Support Group, has devoted the whole of its energies to what its commanding officer describes as "hoodwinking the Hun," but for security reasons no attention has hitherto been called to its work, much of which must remain unrevealed until the war has been won.

The Bomber Support Group, which works closely with the pathfinder force, consists of Mosquito squadrons which undertake a variety of intricate tasks calling for exceptional skill, initiative, courage, and mental agility on the part of the crews. When a night attack has been planned, some of the Mosquito crews go ahead to attack the airfields which the Luftwaffe may be expected to use for night fighters. They also patrol the area through which enemy fighters must pass to intercept our bombers, and they keep a close watch on all defense measures, doing their best to defeat them. Other bomber support units "police" the bomber forces as they penetrate the enemy's defenses, doing everything possible to divert the attention of the German fighters and ground control systems.

By day what are known as day rangers are sent out to harass German night fighter operational and training stations and generally to impede preparations for meeting our night offensive. Sometimes these aircraft range as far afield as Czechoslovakia.

Army Air Forces Convalescent Training Program

Headquarters Army Air Forces, Office of Air Surgeon, Convalescent Training Division

THE Army Air Forces Convalescent Training Program has been in operation in all AAF hospitals for the past two years. During this period, forty-five million man hours of physical reconditioning and educational training have been given. The current teaching rate is in excess of four million man hours per month.

The program has a dual purpose: first, to provide in AAF Regional and Station Hospitals physical reconditioning by a planned and graduated physical training program, and to utilize hitherto wasted convalescent time with an educational program designed to increase the military skills, military efficiency, and general knowledge of the soldier-patient hospitalized while undergoing pre-combat training; and, second, to provide in specialized AAF Convalescent Hospitals a program of physical rehabilitation and reconditioning, psychological readjustment, educational training, vocational guidance, and resocialization for returned overseas casualties.

The results of Convalescent Training have been to (a) reduce hospital re-admission rates by sending men back to duty in better physical condition,[1] (b) shorten the period of convalescence in certain of the acute infectious and contagious diseases,[2] (c) eliminate in a majority of cases the necessity for sick leave, (d) increase the soldier-patient's military skills and efficiency, (e) increase the soldier-patient's general knowledge, (f) practice preventive neuropsychiatry by establishing a series of "patient-doctor" talks designed to assist the soldier in orienting himself to his changing environment, and (g) assist the soldier being discharged on Certificate of Discharge for Disability by providing him with medical evaluation, vocational guidance, psychological and personal counseling, and information on his rights and duties as a veteran.

[1] Journal of the American Medical Association, January 1, 1944—Vol. 124, pp. 1-6.

[2] Ibid. pp. 1-6

Convalescent Training for the Pre-Combat Soldier-Patient[3]

On 1 December 1943, the Air Surgeon, Major General David N. W. Grant, approved the principle of Convalescent Training in all AAF hospitals. On 14 December 1942, General H. H. Arnold, Commanding General of the Army Air Forces, directed that such a program be established in all AAF hospitals. Previous to the inception of this program there was no planned attempt at physical reconditioning or educational training for men hospitalized.

Designed for a dual mission, the program aimed, first, to send the soldier-patient back to duty in the best possible physical condition in the shortest period of time; second, to teach the soldier-patient something that would make him a better fighting man. Physical activity and military education became as much a doctor's prescription as drugs and diet. Muscles were not permitted to become weakened through inactivity, for reconditioning exercises started the moment the acute illness or surgery was terminated. Minds did not become stagnant. Time formerly wasted in reading comic books and adventure stories was spent purposefully. The classroom was moved into the wards and these traditionally quiet and boring rooms hummed with activity. Training films, radio code, camouflage demonstrations, discussions on why we fight and the postwar world, all became an integral part of the hospital day. Radios, carburetors, and airplane engines were brought into the ward, to the bedsides. The hospital was transformed into a combination gymnasium, schoolroom, machine shop, and New England town hall.

The patient had for the first time a real opportunity to think and to work. He was busy, and he liked it. He was working with a purpose; he was becoming strong and ready to fight; his days were full, and there was

[3] Baruch Committee of Physical Medicine, Report of April 1944—pp. 90.

no time for boredom; he was leaving the hospital ready for duty.

The Convalescent Hospital for the Returning Casualty

Based on the observations of the medical, physical, psychological, vocational, and social needs of men returning from overseas combat and a realization that the Convalescent Training Program as carried on in AAF Regional and Station Hospitals was not designed to meet these specialized needs, special AAF Convalescent Hospitals were activated 18 September 1943. Operated by the AAF Personnel Distribution Command, these hospitals provide Convalescent Training Programs designed to meet the needs of the whole man, whatever they may be. Patients are admitted to these hospitals from ASF General Hospitals and AAF Regional and Station Hospitals upon completion of definitive medical care, directly from airports and seaports of debarkation, and from AAF Redistribution Stations if the patients are in need of rehabilitation. Every skill and effort is centered on the task of reconditioning as many men as possible for further military service in the following sequence of possibilities: (1) return to an AAF assignment in original military occupational specialty; (2) return to an AAF assignment in a new military occupational specialty compatible with civilian and military education and experience and physical condition; (3) return to civilian life as a self-sufficient individual both socially and economically; and (4) discharge to the Veterans Administration.

For the soldier-patient who is to return to duty status there is an intensive program of physical rehabilitation, educational retraining, psychological readjustment, and resocialization. Men are brought to the peak of physical fitness through competitive team play, progressive and graduated calisthenics, and active recreation which includes athletics, bicycling, horseback riding, fishing, swimming, hiking, and skiing. These activities not only provide mediums for physical fitness, but aid in the release of physical and emotional tensions and are conducive to psychological readjustment and resocialization.

Military training is provided for further specialization in the majority of military occupational specialties applicable to the AAF. In addition to class and individual instruction in such subjects as administration, clerical training, supply, teletype operation and repair, radio code, graphic arts, navigation, Link Trainer, gunnery, aircraft mechanics, automotive repair, electricity, aircraft instrument repair, machine shop practice, photography, radio operation and repair, sheet metal work, welding, and woodworking, practical experience is provided by "on the job" training in many of these subjects.

Patients also have opportunities to enroll in numerous academic classes, shop classes, and hobby groups. Through the United States Armed Forces Institute and local educational institutions, many of these courses can be taken for high school and college credit. Journalism, radio broadcasting, dramatics, art, handicrafts, and many other avocational activities are more than diversional in that they provide the mediums along with well rounded and complete recreation programs for psychological adjustment and resocialization. Each hospital has a curriculum of approximately 110 courses.

Each patient is assigned to a personal physician who becomes his family doctor for the period of his hospitalization. This personal physician has a paramount place in the Convalescent Hospital. He is the captain of the team of medical specialists, physical therapists, educators, athletic trainers, occupational therapists, social service workers, personal counsellors, and vocational guidance experts, and as such integrates their efforts toward treatment of the whole man.

The latest in physical rehabilitation techniques, use of prosthetic devices, teaching of factors inherent in daily living and skills needed by those who have been physically and psychologically wounded are available. All personnel have been carefully selected on the basis of experience and demonstrated ability, and many have taken special courses given at the Institute for the Crippled and Disabled,

400 First Avenue, New York City, and seminars operated by the Office of the Air Surgeon and AAF Personnel Distribution Command.

There has been especially prepared for these patients a new manual, *The Handbook of Recovery*, a prescription booklet for all types of orthopedic injuries. It begins with an objective and easily understandable description of physiology and psychology that shows the GI soldier why he is in the program, how bones, muscles, and nerves are made, what happens when they are injured, and how they heal. This is followed by a series of two-page prescription blanks in which the soldier-patient is shown pictorially the normal range of motion of the affected part, his disability, the types and amounts of physical therapy needed, and the exercises to be done personally and under supervision. On the back page is a personal recovery chart which is maintained by the patient himself. This has been a very effective innovation, as it not only gives the patient insight and understanding of his condition but also greater motivation. Similar manuals are being prepared at the present time on crutch-walking and orientation for the neuropsychiatric patient.

A special program has been developed for patients with operational fatigue. As an adjunct to definitive psychiatric care, the Convalescent Training Program provides through its directed activities for psychological readjustment through the re-establishment of normal habits, attitudes, concepts, and values. Such psychological readjustment is needed by all men who have been physically and psychologically wounded. It provides for a period of "detraining" and an "unwinding" process by a planned program of physical exercise, competitive sports, and non-concentrative type teaching. With such a program, these war-weary, tense men are aided in a return to a normal emotional and psychological state.

For the men who are to be separated from the service, there is, in addition to the physical reconditioning, educational training, psychological readjustment, and resocialization opportunities, a complete program of vocational guidance based on achievement, aptitude and functional testing and interests determined by a series of short work experiences. In these short work experiences, under a staff of experienced vocational instructors, the patient has an opportunity to participate in a diversified educational program embracing academic subjects, commercial skills, photography, art, woodworking, metal shop, welding, machine shop practice, automotive repair, and a host of allied fields. The man learns not only what he likes to do, but he learns what he is able to do both in terms of ability and in terms of any handicaps he may have. He knows at the end of this period what he enjoys doing, what he is able to do, and the occupations for which he possesses aptitudes. This information is correlated by a skilled vocational counsellor with the job opportunities in the field chosen, and the patient upon discharge from the hospital has a complete objective vocational profile.

Conclusion

The basic philosophy of the Army Air Forces Convalescent Training Program for both the pre-combat soldier-patient and the returning overseas casualty is treatment of the *whole* man through physical reconditioning, psychological readjustment, educational training, vocational guidance and resocialization, and treatment of the soldier-patient as an individual and a name. General H. H. Arnold, Commanding General of the Army Air Forces, has said, "Our responsibility for the Army Air Forces man does not end when the bombs are dropped over the target," and "Every man in the Army Air Forces will be returned to civilian life as good or better than when he came into the Army Air Forces if it is humanly possible." It is toward the realization of these promises that the Army Air Forces has established this program designed to provide for the maximum utilization by Army Air Forces soldiers of the skills and knowledge they have acquired while in service, in order that they may return to duty or to their homes as self-respecting, self-supporting, contributing members of their communities.

Field Artillery in Infantry Combat

LIEUTENANT COLONEL JOHN J. DUFFY
Commanding Officer, 18th Field Artillery Battalion

This article, extracted from a personal letter from Colonel Duffy to Brigadier General Joseph F. Battley, clearly shows that field artillery units must be trained for infantry combat and must be prepared to use every weapon available to them. In fact, no troops of any branch of the service are certain of avoiding combat as infantry in this war of rapid movement, in which infiltration is so often the order of the day.—THE EDITOR.

AT 1800 hours on 2 September the leading elements of the 18th Field Artillery Battalion crossed the Belgian border. The battalion was the last combat element of the right column of combat command. It was preceded by a platoon of six tank destroyers of the ——, and was followed at a time distance of about one hour by the combat command trains. The order of march in the battalion was battalion CO, CP section, Batteries C, A, Headquarters, and B, with the battalion executive bringing up the rear of the column. The service elements were with the trains.

The action that day had been light and the movement steady, with occasional stops of five minutes or so while light resistance was eliminated. However, about 1830 the column halted and the tank destroyers began firing to the east from positions on the road. Investigation showed they were firing at a German column about 1,000 yards to the east and that the Germans were scattering and their vehicles burning. The tank-destroyer commander had orders to continue as soon as possible, so no attempt was made to bypass him.

Approximately ten minutes later a radio call came from our B Battery commander that he was being attacked by German bicyclists. When asked if he could hold them he said he hoped so.

The battalion executive was instructed to return along the route and get some tanks from the trains to help. Then, accompanied by the liaison officer of the armored field artillery battalion and his half-track, I reached B Battery about 1900.

Before arrival, I had expected to find B Battery's column subjected to scattered sniper fire, but instead I saw a full-scale battle in progress. The road north and about seventy-five yards away from the junction was covered with German dead and wounded and their bicycles, enemy machine guns had been emplaced and were firing, and the enemy were attacking through the ditches and woods and from behind the houses. Our men had posted themselves behind vehicles, hedges, or anything from which they could fight. Those whose jobs made it impossible to find adequate cover were calmly going about their business in the open. The most impressive thing was the manner in which they were all doing their jobs. All weapons were in play, ammunition for machine guns and bazookas was being checked and replenished, and the defenses constantly improved.

There was little left to be done except post the half-track, check the defenses, and coordinate contact with Headquarters Battery which was next ahead of B.

About 1930 the enemy fire abated and the battery stood by to await developments, which were not long in coming. In a few minutes, down the road from the cover of the trees came from seventy-five to one hundred Germans followed by five trucks and half-tracks approximately ten yards apart. There were machine guns on the vehicles and it was obvious that the men on foot were armed, but for some reason not a shot was fired. The enemy were carrying their arms at the port and their intentions seemed doubtful. When about one hundred yards away they began to yell "Sieg Heil" and run toward us. Their vehicles picked up speed behind them.

About thirty yards in the lead was a single German carrying a light machine gun with a tripod mount. When about fifty yards away he suddenly dropped to the ground and fumbled with the mount. This dispelled all

doubt as to the enemy's plan, though until that movement we had thought they might be yelling "We surrender." Four or five men stood up and finished off the machine gunner with their carbines and the rest of the battery opened up on the column. The fifties and one of the bazookas cut into the vehicles and shortly had all stopped dead and burning. The ammunition of one enemy half-track went up, adding to the noise, and no doubt causing a few more German casualties.

Although the enemy had set up machine guns at the top of the hill to cover their advance and had considerable small-arms fire power in their column, B Battery's men remained in their exposed positions along the road to fire round after round into the Germans.

The advantages of terrain were with the enemy, who had high ground looking down onto our road, yet the battery seemed to bear charmed lives. Aid men took care of them quickly and the others continued firing without hesitation. Bullets were clanging into our vehicles, but without serious damage. Later it was found that a bullet had penetrated the battery field desk and become embedded, of all places, in the Property Book.

It was learned from prisoners later that the enemy had hoped, by a mass attack, to break through the column at the road junction, thinking it to be a force of a few vehicles only. When this failed they changed their tactics, dispersed, and tried to creep up on the column through the hedges and ditches, and some occupied the near-by houses and opened fire. Some of these attempts to close must have come near success as after the fight several German dead were found only thirty yards from our position.

This phase of action sounds like a dime thriller, but it was. The distances involved were well within carbine and bazooka range so that every weapon in the battery except the guns was in action. An example of the action of the battery as a whole was the teamwork displayed by the machine gunners and the bazooka men at the corner. When the machine-gun fire at the two houses along the road, from which some of the enemy were firing, proved ineffective, the bazooka went to work and shortly had one house on fire and several holes in the other. After that we were not troubled from that direction.

Time passed quickly and it was dusk almost too soon. By 2100 it was difficult to see, and the battery was forced to think about conserving its small-arms ammuntion. Fortuconserving its small-arms ammunition. Fortumessage from —— that he was bringing up some tanks from the train.

I left to see about the conditions up ahead and found the roads clearing up. What happened later was described to me. They moved four tanks up to the left flank and completed the demoralization of the enemy. Shortly after their arrival (about 2115), white flags or shirts appeared and the battle was over. The prisoners were herded into a field and left with the signal section of B Battery. A count of the able bodied was 248. No count was made of the wounded. They were turned over to the military police of the rear echelon about thirty minutes later.

Stop thinking that you have had an overnight problem when you go out for one night. Units should stay out for several nights, find out how to read a map with a dim flashlight and huddled under a raincoat so no light will show. They should do some of the old fashion doughboy compass marching, that and survey. Stress more the tactical relationship between the infantryman and the artilleryman, the intimate association between the two.

—An artillery battalion commander in Italy.

Japanese Antitank Defense in Burma

FROM AN OFFICIAL REPORT.

DUE to the fact that in most cases tanks were confined to the road, the Japanese defense was relatively simple. Guns were invariably sited in pairs from covered emplacements located from thirty to one hundred feet from the road and normally firing directly across the road. Machine-gun emplacements were used to protect the antitank-gun emplacements. Whenever they were available, the antitank-gun emplacements were located in the vicinity of large trees which would prevent the tanks from overrunning the gun positions. The antitank defensive system showed careful coordination between antitank guns, automatic weapons, and magnetic mine thrower teams.

The emplacements were skilfully constructed and very carefully concealed. Tank crews very rarely saw an emplacement until the gun fired. The tank of the author of this report was hit four times by an antitank gun located not over thirty feet off the road and which was not noted during fifteen minutes of observation of the area until the gun actually fired.

The amount of top cover put on the emplacements depended upon the length of time the area had been occupied. Sidewalls and top cover varied from two feet to six feet in thickness. Gun openings were generally limited to a narrow slit eight inches high and very rarely more than two feet long. A very low fire lane was generally cut from the emplacement out to where tanks would have to pass. Ammunition and spare members of the crew were generally located in the rear of the covered emplacements in deep, narrow trenches. It was extremely difficult to get any kind of a hit into these trenches that would destroy the crew and the ammunition. Unless a direct hit could be directed against the gun opening, the standard high-explosive shell for the 75-mm gun was not particularly effective against these emplacements. However, when HE could be placed directly in the gun opening, the damage to the gun and crew was terrific. When HE could not be directed against the gun opening, the AP-HE (APC) shell was found very effective in destroying the emplacement. The penetrating effect of the AP-HE shell was excellent. Frequently they would go through four to six feet of dirt and logs, and would then burst within the emplacement. Since the range was rarely more than one hundred feet, we have no data on the effectiveness of this shell at a longer range.

Whenever possible, the Japanese located their antitank guns on the far banks of streams. Since most of the streams encountered had sheer, steep banks of from twelve to fifteen feet, they presented a very difficult object to cross. Practically every stream encountered had a minimum of four antitank guns located on the far bank, covering the road. It is very peculiar, but most of the bridges across these streams were not blown up. The Japanese apparently depended on the vulnerability of the light tanks to prevent their crossing the bridges in face of gun fire, and the flimsiness of the bridges which would not allow medium tanks to cross them. The highest known density of antitank guns located was fourteen antitank guns on a 350-yard front. The principal defense was located on the far bank of the Pangyu Hka and consisted of eight antitank guns, in very strong emplacements, covering the bridge. The other six guns were located in such thick jungle that tanks could not get in to them. These guns were so located that they fired into the sides of any tanks engaging the antitank guns defending the bridge crossing. Twelve of the guns are known to have been destroyed by medium tanks, but after the position was finally taken, two emplacements were found which had never had a shot fired at them. Once the antitank defense had been disrupted, protecting automatic weapons generally faded into the jungle and were rarely seen by the tank crews. If infantry did not immediately occupy the position, as soon as the tanks withdrew, the defense was immediately reorganized.

The Japanese soon learned that we only had a few medium tanks and that they could

not harm them. Whenever possible, they prevented giving away their position to medium tanks and waited before opening fire on following light tanks. In one instance, eight medium tanks, accompanied by fourteen light tanks, penetrated about five miles into the Japanese positions. On the way in, the medium and the light tanks used sound tactical formations, in mutual support of each other. No antitank fire was encountered. On the way out, the medium tanks outran the light tanks and passed between two points of woods. The light tanks, in attempting to catch up, fell into more or less of a column formation. Not a shot was fired by the Japanese until the last four light tanks passed through the gap. All four of these light tanks were hit in the side, right in line with the gas tank, one shot for each tank, and all tanks burned up. By the time this took place, the company commander was so far in front that he did not know he had lost four tanks until the crews came in on foot.

In another instance, three medium tanks, accompanied by fourteen light tanks, swung around a point which they had been instructed to cover while the light tanks passed by. The medium tanks failed to cover and the last light tank in the column was hit in the side, in line with the gas tank, when it passed by a concealed antitank gun. A medium tank, which turned to the rear to knock out this gun, experienced great difficulty in finding it since the antitank gun refused to fire a single shot against the medium tank. However, once an antitank gun was located, the gun crew fought with great bravery and skill. Some medium tanks were hit as many as nineteen times before they could knock out an emplacement and destroy its crew.

All antitank personnel encountered were highly trained, efficient soldiers. In every case where tank personnel committed a tactical error, they took full advantage of it.

"Want Willie" Attacks

From *The Sphere* (London) 6 January 1945.

IT was recently made public that a portion of the Coastal Command RAF group concerned with attacks on enemy shipping has for some time been based in Belgium. The forcing of German coastal convoys farther up the coast of Holland makes British-based RAF attacks on the Germans more difficult. The group which carries out the shipping attacks has already made more than 6,000 sorties since the landing in June, and the enemy is no longer moving any considerable convoys of shipping over stretches farther west than that between the Elbe and Borkum. Even this shipping consists of small coasters. Coastal Command tactics have considerably developed since the early days of the war. Rockets can disable or sink ships in a manner impossible for cannon. The Germans were gradually forced to give up sailing their ships by day, and it was necessary to develop a method of night torpedo attacks. Enemy E-boats and R-boats create such a wake that their tracks can be spotted without flares and attacked with Swordfish or Albacores, which can turn and swoop quickly. The enemy retorted by stopping their ships dead when they saw signs of an attack, so that there was no longer a wake to spot. Then the RAF developed what is called the "Want Willie" method. One aircraft drops flares, and calls "Want Willie." Whereupon the attacking aircraft arrives, while the first plane illuminates the target. Escorts from Fighter Command or from the American Air Force have discouraged enemy air attack on Coastal Command machines. Large convoys have been attacked with a multi-winged strike of nearly one hundred aircraft with three "flak-busters," three rocket projectors, and three torpedo-carriers launched against a single large enemy escort ship. The machines dive on the enemy with their engines shut off and inflict what is described as a "silent death."

MILITARY NOTES AROUND THE WORLD

GERMANY

More Light on the V-2:

Despite multitudinous difficulties, the Germans have succeeded in storing large bulks of both liquid oxygen and ethyl alcohol, to the amounts of 11,000 pounds and 7,500 pounds respectively, in two large aluminum fuel tanks in their long-range rocket, the V-2. The turbine assembly, which was originally thought to be used for liquefying the oxygen, is now known to be used for driving the fuel pumps which force the two fuels into the combustion chamber.

Although there are probably several experimental long-range rockets of various sizes, the one with which the British are most familiar is forty-six feet long and five feet six inches in diameter. The weight for a range of about 200 miles, or a "flying" time of five minutes (which brings the major cities of London, Paris, Brussels, and Hull, and the intervening terrain, into range from bases in Holland), is about twelve tons.

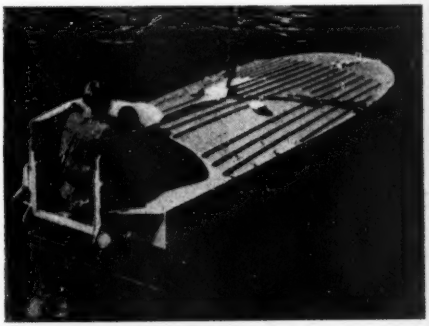
After take-off, the continuous combustion of the alcohol/oxygen mixture continues, and creates a thrust of about twenty-six tons, propelling the rocket vertically upwards. The control mechanism, located to the rear of the warhead, operates to turn the missile at an angle of forty-five degrees, approximately one minute after launching, and the fuel is then cut off, originally by remote radio control from the ground but now by pre-set instruments in the rocket. Traveling at about 3,000 miles per hour, the projectile describes a parabola through the stratosphere at a height of about sixty miles, until it is slowed down by the increasing density of the lower altitudes before hitting its "target." The terminal velocity is sufficient to cause the rocket to become hot through friction, and it has been observed glowing red.

Because of the speed of the V-2, the noise of its passage is not heard until after detonation, when it appears as a continuous rumbling noise, lasting for nearly a minute.

The same phenomenon has often been noticed in the past on many occasions in connection with long-range shells traveling at supersonic velocity. In some circumstances, the detonation of the gun which fired the shell has been heard several seconds after the actual arrival of the shell and its explosion.

(*The Aeroplane*, Great Britain)

Explosive Speedboat:

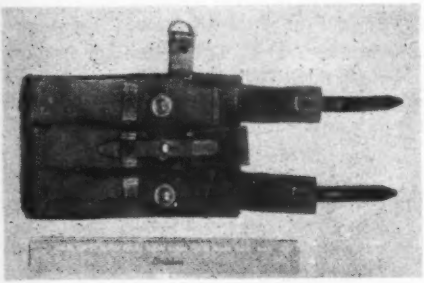


This German explosive speedboat is shown as it is being lowered into the water before starting for an enemy target. Loaded with explosives, it is steered by its pilot to within a certain distance of its target [Allied sources

say within fifty yards], when the pilot leaps clear of the boat, at the same time pressing a lever which casts out a small raft upon the water. While the speedboat travels on toward the target, the pilot climbs on the raft and floats until he is picked up by a friendly patrol boat.

(Völkischer Beobachter)

Nazi Ammunition Pouch:



The German ammunition pouch shown in the picture is designed to carry the long clips used with Nazi machine pistols. Two such pouches are normally worn at an angle on the cartridge belt. The belt is slipped through the belt-loop on the rear of the pouches. The angle at which the pouches are worn makes them readily accessible. The pouches are also held up by the usual cartridge belt suspenders which hook into the D-ring at the end of the leather straps. The pouch has appreciable bulk and weight in contrast to most small-arms ammunition carriers, but this is almost unavoidable in view of the long clips carried.

(Quartermaster Training Service Journal)

German 17-cm Gun:

The German 17-cm (6.7-inch) gun which has appeared in this present war is a fine piece, capable of devastating punishment at annoying ranges. It is outperformed by a U. S. 20.0-cm gun (eight-inch), however.

The original German nomenclature in World War I was 17-cm SK L/40 Cannon on Carriage 40 (*Schwere Kanone Lafette 40*, heavy carriage).

The modern version is known as 17-cm K on 21-cm Mrs. [mortar] Lafette 18. The carriage is convertible for either the 21-cm mortar or the 17-cm gun tubes by adjustment of the recoil system.

Present overall length of the 17-cm gun tube is twenty-eight feet. This tube has a conventional Krupp type of breech, requiring use of a cartridge case. The chamber is five and a quarter feet long, permitting use of a relatively heavy charge.

Ammunition for this 17-cm gun is somewhat complicated. Two shells are intended for this weapon, both streamlined. When used with a super charge, the lighter shell is the subtle means resorted to by the Germans to gain an unusually long range.

An anti-concrete shell has been reported in existence. Even if this be fact and not mere rumor, the destructive possibilities of the German 17-cm gun are not yet on a par with our own eight-inch gun.

(The Field Artillery Journal)

JAPAN

Air-to-Air Bombing:

Japanese air-to-air bombing has increased lately. In one recent mission, U. S. air crews reported several dozen such attacks. Most of the bombs were released in level flight from the front, a few in dives or banking turns. Besides the familiar phosphorus bombs, a number of odd missiles were noted. These are the nicknames and descriptions as given by the crews:

Stovepipe—A cylinder, two to three feet long, on a small parachute; exploded with a puff of black smoke.

Orange crate—Container for butterfly bombs.

Ball and chain—Cylinder flat on ends, with black ball connected by chain three times the length of the bomb; burst similar to phosphorus.

(Air Force)

GREAT BRITAIN

The New Fairey Firefly:

This fighter-reconnaissance aircraft, the new Fairey Firefly, now in use in the Royal Navy, has a span of forty-four and a half feet and a length of thirty-seven feet. It has a Rolls-Royce Griffon engine driving a Rotol airscrew, and is armed with four 20-mm cannon. Its wings fold for stowage in aircraft carriers in the unusual manner shown above. There is a crew of two—pilot and observer-navigator.

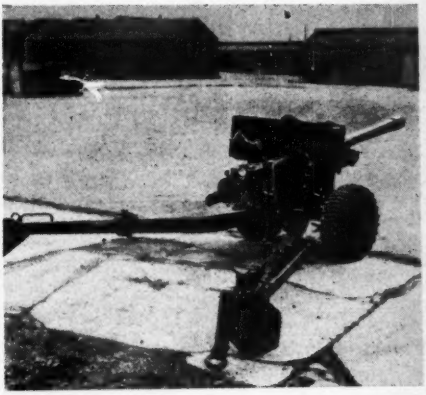
(*The Sphere*, Great Britain)

More details are now available of the Fairey Firefly reconnaissance-fighter . . . Wing folding is manual, but is accomplished in a few seconds. The stowage space required by the Firefly is equivalent to a box of its own length and its own height, square in cross-section. The success of fleet-fighter design is to pack all the extra gear needed for flappery and wing folding and heavy armament into that space. Not only has this been done on the Firefly, but also comprehensive radio and navigational equipment have been added, together with space for an observer.

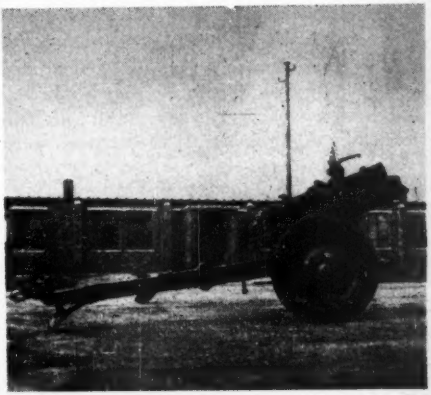
(*The Aeroplane*, Great Britain)

Equipment of a British Airborne Division:

One of the governing factors of the successes achieved by the full-scale airborne landings in Holland was the wide variety of heavy equipment landed with the troops—



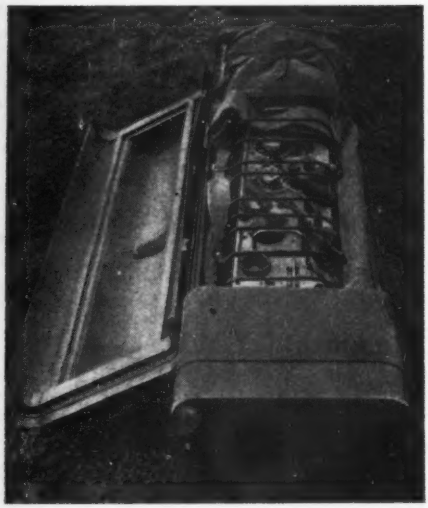
SIX-POUNDER ANTITANK GUN CARRIED BY BRITISH AIRBORNE DIVISIONS. IT HAS BEEN MODIFIED FOR GLIDER TRANSPORT.



A 3.7 HOWITZER INCLUDED IN THE EQUIPMENT OF BRITISH AIRBORNE DIVISIONS.

equipment which the Germans never expected to encounter when they attacked the airborne forces. One of the enemy's greatest surprises in this particular operation was when his panzers ran into a screen of anti-

tank guns manned by troops who had landed from the skies a short time previously. The panzers received a severe mauling. The guns in question were two famous types of British artillery weapons, the 17-pounder and the six-pounder, the latter having been slightly modified for transport by glider. Tanks, too, are now commonly landed in an airborne operation. Apart from tanks, British Hamilcar and Horsa gliders carry vehicles of all kinds, and heavy equipment including 75-mm howitzers, three-inch mortars, assault boats, bridging material, and smaller parachute equipment. Equipment carried by the troops themselves has recently been modified to fit into a comprehensive kitbag, instead of being strapped to the soldier in many packages.

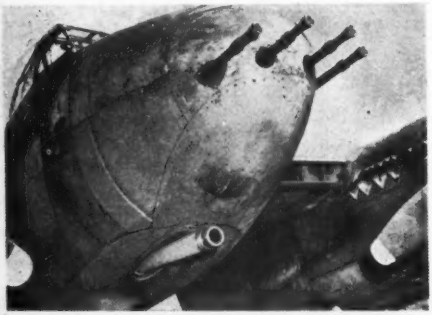


A TYPE OF BRITISH AIRBORNE WIRELESS SET PACKED IN ITS PARACHUTE CONTAINER.

A PIGEON CONTAINER CARRIED BY A PARACHUTE SOLDIER.

(*The Illustrated London News*)

Armament of the Mosquito:



The British Mosquito has been described as the most versatile aircraft in the world. In its Mark XVIII version, in addition to carrying four .303 machine guns, it mounts a six-pounder cannon firing the same weight of shell as one of Britain's most effective anti-tank guns. The six-pounder can be used as a single-shot or fully automatic weapon with a firing rate of one per second. One of the main triumphs of the New Mosquito has been the strafing of U-boats, and its achievements also include the holing and damaging of many enemy surface vessels.

(*The Illustrated London News*)

NETHERLANDS

Dutch Seabees and Engineers Corps:

Netherlands naval forces in liberated Holland have organized a special battalion of technical harbor troops to repair damaged ports and inland waterways.

An Engineers Corps (*Genietroepen*) was also created by the Netherlands Army, as there is a great need for technical troops. The countryside, with its intricate canal system, its polders—land reclaimed from the sea—and thousands of bridges has caused great strain on troops responsible for creating and maintaining lines of communications.

Regular soldiers and noncommissioned officers of the Netherlands Army as well as Netherlands Navy reservists have been called up, while drivers and motor mechanics have been ordered to report to the regional labor offices. These moves are in addition to the regular enlistment for active military or naval service.

(*Netherlands News*)

UNITED STATES

Armored Utility Car M20:

The new high-speed armored utility car M20 is used by Army field commanders. It carries a six-man crew, is equipped with two radios, and is armed with a .50-caliber machine gun.

(*Army Ordnance*)

Airborne Tank T9E1:

The airborne tank T9E1 is carried by gliders to places which would ordinarily be inaccessible to tanks. Familiarly known to troops as the "Locust," it is compact and streamlined and has a low silhouette. It is capable of crossing rough terrain at fifteen to twenty-five miles an hour and travels on roads at speeds up to forty miles an hour. It mounts a rapid-fire, hard-hitting 37-mm cannon, which fires both high explosive and antitank shells, and has a .50-caliber machine gun. The tanks and crews can arrive on the scene of action as a surprise move, with the vehicles in fresh mechanical condition and the crews rested and ready for battle.

In the picture, the Locust is entering a mock German village at the Army Service Forces Training Center, Aberdeen Proving Grounds, Maryland.

(Signal Corps photo)

The Privateer:

The Navy has announced the addition to the fleet of a new and powerful search and bombing plane. The plane, called the Privateer, or PB4Y-2, is a development of Consolidated-Vultee's Army B-24 Liberator bomber and freight carrier. It differs so much from that plane as to amount to a new design.

The fuselage of the search plane is more than seven feet longer than the Liberator.

It carries twelve .50-caliber guns, and can stay aloft twenty hours. Its speed is more than 250 miles an hour.

With the new Privateers capable of operating over 3,000 miles, no part of the Japanese Empire or the waters used by her fleets can be hidden from the Navy's eyes and ears.

A distinguishing feature of the Privateer is a single tail instead of the twin empennage of the Liberator.

The Privateer is designed primarily for long and lonely search missions.

The four Pratt & Whitney twin-row Wasp engines have been redesigned to give greater fuel economy at cruising speeds and considerably more horsepower at the take-off.

The armament is distributed in power-driven turrets in nose and tail, and on the top and bottom of the fuselage. Firing ranges have been extended by the removal of the twin rudders.

(From news reports)

Jungle Flame Gun:

The jungle flame gun, a new portable flame thrower developed by the Chemical Warfare Service, has met with instant success in the Southwest Pacific Area, where large shipments of this weapon have answered a pressing need for a flame thrower especially designed for use in tropical climates. Designated as the M2-2 portable flame thrower and informally known as the "atomizer," the apparatus was built to fire jellied oil, a thickened fuel made up of blazing oil chunks which spatter and cling to the target. The name "atomizer" comes from a small atomizer hole in the nozzle which sprays a fine, readily ignited mixture as a booster to help start the main stream of oil.

Other features include a revolver-type ignition cylinder at the nozzle, pistol-grip triggers, and a tubular steel pack frame which allows the apparatus to stand upright while being filled. The smooth contour of the alloy steel fuel tanks permits the operator to crawl through underbrush without snagging. The flame gun is so waterproof that it could be immersed in the ocean for several hours, pulled out, and still be ready for action. The range of the earlier M1A1 model with thickened fuel has reached sixty yards, but the much greater range of the new weapon has not been disclosed.

(*Army and Navy Register*)

Sun Takes Salt from Sea Water:

A floating distillation unit that uses the sun's heat to convert sea water into drinking water has been developed and is now standard equipment for multi-place life rafts.

This new inflatable solar still is a balloon-like cylinder twelve inches in diameter and thirty inches long. It is made from Vinylite plastic, which permits ninety percent of the sun's rays to pass through. The heat is then absorbed by a plastic screen in the center of the still, which has black cellulose sponges sewed to it. These sponges are saturated with sea water before the still is blown up, and as the sun evaporates the water, they serve to retain the salt residue. The vapor, on the other hand, condenses and trickles down the sidewalls to a fresh-water reservoir in the bottom where it is stored until needed. Water is drunk direct from the still.

Maximum output varies from one to five pints of water daily for each unit, and as many as six of these two-quart capacity stills may be floated from a single raft.

Also included in AAF life rafts are tarpaulins for catching rain, and desalting kits for use on cloudy days. Cans of water are included for emergency use as well.

(*Air Force*)

FOREIGN MILITARY DIGESTS

German Tactics in a Delaying Defense

Digested at the Command and General Staff School from an article in *The Times* (London) 11 December 1944.

This article is very interesting when read in the light of the German offensive which started one week later on 16 December 1944.—THE EDITOR.

To the U. S. Ninth Army fell the honor of being the first of the Allied armies to reach the Roer River. In the process of getting there, it ejected substantial German forces from a deeply fortified area, took more than 8,000 German prisoners, hammered two Volksgrenadier divisions out of the battle altogether, and inflicted heavy casualties in both men and tanks on the 9th Panzer and 15th Panzer Grenadier Divisions.

The advance to the Roer, an average of nine miles from the starting point, took just over a fortnight. Given better weather, it would certainly have been quicker; but even discounting the assistance which the enemy received from the weather, the quality of his resistance has inspired some respect for the German recuperative power. For an army which suffered such terrific setbacks in the battle of France, he has succeeded in assembling a substantial array of artillery, antiaircraft guns, and antitank weapons on the front opposite the Ninth Army. The Germans are not short of ammunition. Their troops are well enough clothed and apparently well enough fed. They are reputedly short of petrol, spare parts, and some other equipment, but having regard to their shortened lines of communication it would probably be unsafe to bank upon any serious deterioration in their supply position in the immediate future. Manpower is from all indications their main problem. A batch of prisoners taken on the banks of the Roer River a few nights ago was found to consist of the engineer units of two German divisions acting as infantry.

This army's impression of Volksgrenadier infantry, hastily trained products of Hitler's total mobilization, is that they are not of much account. The will to fight for the Fatherland may or may not be there; the capacity is not. The panzer and panzer grenadier troops are, however, another story. They are competent, and do not surrender easily. For the defense of the Ruhr and Rhineland, the German High Command is believed to have available a good many more such first-class troops than they have committed in the battle west of the Roer. In particular, nothing seems to have been seen of the reconstituted and refitted panzer formations forming what the Americans refer to as Germany's "Salvation Army." Assuming that this army is in the Aachen area, the German Command may well take the view that it can be used most effectively if and when the Americans are astride the Roer River, and that meanwhile every day gained by the delaying action on the west bank can be used to improve its efficiency for the eventual counterstroke. In any case, American expectations are that, grim as has been the fighting of the past three weeks, harder battles are to come when the threat to the Ruhr and the Rhineland becomes more imminent.

The field in which the Ninth Army fought

its battle was a square of the German plain of which Geilenkirchen, Würselen, Altdorf, and Linnich formed the four corners. They had the River Wurm behind them, the River Roer before them to the east. To the north was a zone of unpenetrated Siegfried Line; to the south an extensive built-up area through which the First Army had to batter its way. The plain was traversed by a few ridges of slightly rising ground. It was along these ridges, coveted by both sides for artillery observation and cover from the other side's observation, that the bloodiest fighting took place.

The whole stretch of plain was densely sown with minefields, honey-combed with trenches and other prepared fire positions, and thickly dotted with small towns and villages, each of which was a German strongpoint, with fields of fire covering the countryside in between. It had been hoped that bombers and gunners would get the Germans out of their villages without more ado. Sometimes they did; but the German villages were well provided with cellars, and more often than not after the bombardment the infantry and tanks had to hunt the defenders out street by street or house by house. Some villages had not only to be taken but retaken; some were death-traps for the defenders; but the Germans were evidently prepared to pay the cost of defending them in order to absorb the American troops and delay the advance.

Even if the mud had permitted it, there was in this restricted battlefield no opportunity for the sweeping movements of tanks in mass which, in the battle of France, accomplished the destruction of German armies from flanks and rear. A breakthrough of the enemy's fortified area would simply have brought the American tanks up against the barrier of the Roer. Their objectives were of necessity local and short-range, and in conditions that limited the development of forces and checked the speed of vehicles they found themselves fighting in some respects at a disadvantage. The enemy's Mark IV tanks give the Shermans comparatively little trouble at any time. To handle the Mark V and VI—50, 60, and 70-ton Panther, Tiger, and King Tiger tanks—mounting an 88-mm high-velocity gun and heavily armor-plated, the Shermans require to be able to take full advantage of their superior numbers and speed.

The Germans used large numbers of these heavies, both as static artillery against the advancing Americans and mobilely in counter-attack. In either capacity they were found formidable. The American tank gunners are quicker on the trigger than their German opposite numbers. If they can get within range unobserved, they generally get in the first shot. But if the Sherman's 75-mm gun is to be effective, it must hit the Panther or Tiger on the side or rear, where it is less heavily armored than in front. That calls for maneuvering, and the American tank men's experience is that on soft ground a German heavy tank with a 34-inch tread is just about as maneuverable as is a 28-ton Sherman. In one engagement with Tigers, a detachment of the 2d Armored Division got six of the enemy for the loss of six of their own tanks. They regarded that as exceptionally good trading.

Still, this battle has shown that the possession of one weapon superior in certain conditions to anything the opponent has is not enough for victory. It was the Germans, with their heavies, who withdrew, and the Americans, with their lighter tanks, who advanced. American armor refused to be discouraged, and precise American artillery, 90-mm tank destroyers, which would be still more useful if less vulnerable, and Thunderbolts helped to turn the scales in their favor. For the reasons already indicated by General Eisenhower, the American gunners are not in a position to fire as many shells as they would like. They can and do, however, get a devastating effect from few rounds through a system of direction control, which permits fire from every battery within range to be concentrated at need on a particular target. And there are plenty of guns. Prisoners who have been on the eastern front say that the Russians, whose artillery is one of their long suits, shot more often than Americans, but that they had never experienced anything quite so dreadful as a salvo of American "time-on-target" fire. The words "the enemy

counterattack was broken up by our artillery" became during the recent battle, not without reason, almost a stock phrase in reports from forward command posts.

Thanks to the American command of the air, light aircraft are able to fly up and down the lines by daylight, spotting for the American artillery. The Germans do not attempt anything of the kind. The Thunderbolts, when they can get at them, usually account for a few German tanks, directly by dive-bombing and indirectly by pinpointing them for the gunners. Mostly, however, the weather during the advance has been unkind. There were a good many days—perhaps more than were expected—on which flying was impossible, but not many on which the Thunderbolts could be sure of finding the particular targets assigned to them. The army nevertheless describes the support given to the ground troops from the air as superb.

The ground troops, for their part, fought and won their battle in rougher climatic conditions than they had ever before been called upon to brave. The infantrymen, chilled by days and nights of exposure to rain, sleet, and biting winds, had to fight about as hard to keep the mud out of their weapons as to get the Germans out of the villages. Vehicles floundered to a standstill in the wet loam soil, which, once traversed by a few wheels and half-tracks, seemed to have no bottom left. The traffic problems of the tanks can be imagined.

It is a high tribute to the fighting qualities of the "Old Hickory" and other divisions that, in conditions to which they were completely unaccustomed and which were all in the favor of the defense, they kept grinding steadily forward over a period of a fortnight and completed successfully their offensive mission. They came out of action with respect for the skill with which the Germans had conducted the delaying battle. Whatever may have been the case in the past, the direction of the enemy's military operations in the west is no longer, in the opinion of many American officers, being directed by a corporal.

Attack on the Amiens Prison

Digested at the Command and General Staff School from an article in *The Royal Air Force Quarterly* (Great Britain) December 1944.

"MOSQUITOES are to attack the prison at Amiens in an attempt to assist more than one hundred prisoners to escape. These prisoners are French patriots condemned to death for assisting the Allies."

This was the briefing one day of air crews at an Allied Expeditionary Air Force intelligence room, and it was the prelude to an epic operation by the Royal Air Force. For security reasons, it has not been possible until now to give a full account of the exploit.

The RAF undertook this exacting task, accepted the risk of killing people who, in any event, were to be put to death by the enemy, and eventually learned that as a result of their attack on the jail, many prisoners escaped and considerable casualties were caused among the German guards.

The prison was a cruciform building in a courtyard, surrounded by a twenty-foot high wall, some three feet thick. The yard was fenced internally to segregate the prisoners while they were at exercise. Accuracy in attack was regarded as essential, for whereas on the one hand the walls and buildings required to be breached, on the other, in order to reduce casualties to a minimum, it was important that the least possible force should be used.

The jail was guarded by German troops living in a special wing, the location of which was exactly known. The attack had to be sufficiently discriminating to ensure that decisive force was used against this part of the building. The time factor, too, was important, for the escaping men were to receive valuable assistance by patriots

from outside if these patriots could be warned of the exact time of attack.

The task, therefore, called for secret and detailed planning, and a model of the prison and its surroundings was made from photographs and other information already in the Air Ministry's possession. Thus, in planning and briefing, every aspect was studied.

To carry out this exceptional operation, the task was entrusted to a Mosquito wing of the RAF Second Tactical Air Force comprising British, Australian, and New Zealand squadrons, and including RCAF [Royal Canadian Air Force] airmen, commanded by Group Captain P. C. Pickard.

It was decided to allocate two fighter squadrons for escort duties, from a fighter group that played a memorable part in the Battle of Britain.

The task added to the many difficult and daring operations which the Mosquitoes of the Second Tactical Air Force have performed—operations which have included the destruction of the single-building German Headquarters of Civil Administration in the center of the Hague, numerous enemy army barracks or chateaux converted for occupation by German troops in France, German army headquarters in the field, electric power stations, and other targets which demanded the most exacting precision attacks.

Of all these operations, however, the Mosquito aircrews counted as the most intricate the action against the Amiens prison on 18 February 1944. On the morning of that day the aircrews rose before dawn for their very careful briefing, to find the airfield covered with snow and low cloud and with little prospect of clearance.

Once the plan was outlined, the crews, the most experienced from each squadron, were determined to press home their attack in spite of the adverse weather. It was obvious that the prison walls must be broken in at least two places to enable any escape whatever to be made. At the same time, both ends of the main building had to be hit to release the prisoners from their confinement. Accordingly, the first wave of six aircraft was detailed to breach the wall on its northeast and northwest perimeter. The second wave of six aircraft was to divide and open up both ends of the jail, and to destroy the German guards' quarters. A third wave was available should any part of the plan miscarry.

To obtain the accuracy required, it was necessary to bomb from "deck-level," and each wave had to be so timed that the results were achieved in their right sequence to avoid casualties by collision over such a small target. A Mosquito was allotted to the operation to make film and photograph records of the attack.

It was an hour before midday when the squadrons left their snow-covered airfield to rendezvous with their fighter escort on the south coast of England. From there the formation flew at sea level to the French coast, swept round the north of Amiens, and approached their objective along the straight Amiens—Albert road on which the prison is located. The second wave, on approaching the target, saw that the first wave had been successful.

Through the dust and smoke of the bombing, the corners of the jail were seen, enabling an accurate attack to be made. This, too, was so successful that Group Captain Pickard, circling the target, was able to send the third wave home without any necessity for its attack. The photographic Mosquito, making three runs over the objective, saw the breaches in the wall, the ends of the building broken, prisoners running out through the breaches, Germans lying on the ground, and, on the last run, some patriots disappearing across the snow on the field outside the prison.

The operation was not completed without losses, however, for two Mosquitoes were shot down by enemy fighters, as also were two of the fighter escort. Although, as was unavoidable, some of the patriots were killed by German machine guns as well as by bombs, it is known that the Germans them-

selves suffered casualties from the attack. The attack on Amiens prison will remain one of the most memorable achievements of the Royal Air Force.

The Air Operations in Holland

Digested at the Command and General Staff School from an article by Lieutenant General F. A. M. Browning in *The Journal of the Royal United Service Institution* (Great Britain) November 1944.

AFTER the great armored drive from the Seine right through the east of Brussels, and when the administrative position allowed of a further advance by the Second Army, the latter soon found itself fighting a hard battle against determined German resistance along the Albert Canal from Antwerp to Maastricht (see sketch). After hard fighting, the advance in the center had reached, and obtained a foothold across, the Escaut Canal on the main road northwards into Holland. The degree of enemy resistance, the number of waterways, and the type of country were proving serious obstacles to the further advance of the Second Army, and autumn was drawing on.

In order to break out of this restricted and stouly-defended area, the Commander in Chief decided on an airborne operation of great magnitude, aimed to achieve the following results: the opening up and holding open of the corridor Eindhoven—Veghel—Grave—Nijmegen—Arnhem, and the capture of the bridges en route, notably those at Grave over the Maas, over the Maas-Waal Canal west of Nijmegen, the great road bridge over the Waal at Nijmegen, and the bridge over the Neder Rijn at Arnhem.

Immediately the corridor was established, the center corps of the Second Army was to break out along the corridor and drive at high speed to link up with, and pass through, the airborne force. The flank corps were to advance with all speed, but of necessity more slowly, to protect the flanks of the corridor and to reinforce the airborne troops holding it.

The airborne forces involved were the 1st British Airborne Division, 82d and 101st U. S. Airborne Divisions, and a Polish parachute brigade. The whole operation was under the British Airborne Corps.

The airborne plan was simple. It was to be carried out in daylight, with full air support, and was the greatest airborne operation ever envisaged or launched.

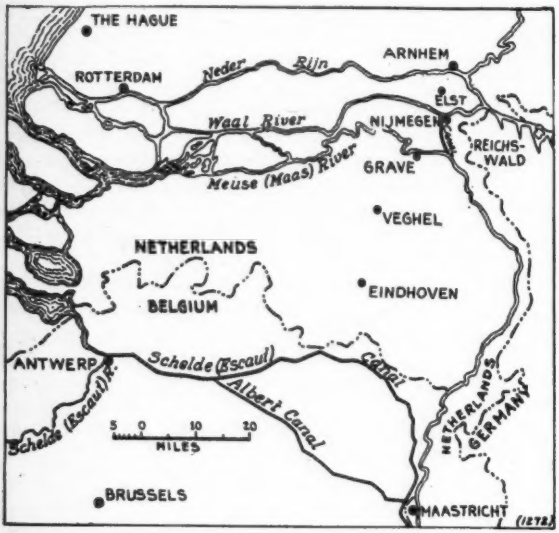
On 17 September the first lift of the airborne force landed in Holland. The 101st Division was along the corridor from inclusive Eindhoven to exclusive Grave. The 82d Division was at Nijmegen, with the task of capturing the high ground south of the town, the highest ground in Holland, and the bridges in that area from inclusive Grave to inclusive Nijmegen. The 1st Airborne Division landed at Arnhem to capture the Arnhem bridge. Corps headquarters accompanied the 82d Division into the Nijmegen area.

In order to ensure the breaking out of the center corps of the Second Army, it was essential that the maximum force available should be dropped in the south, the same size force in the Nijmegen area to ensure the high ground and the bridges, and (in the initial stage only) the somewhat lesser force of the 1st Airborne Division at Arnhem. A larger force at Arnhem, with lesser forces in the south, would definitely have prejudiced the initial breakout, without which the whole operation would be doomed to failure.

The airborne forces, carried in British and American aircraft and gliders and supported by the Allied air forces, achieved complete surprise, and landed accurately and practically up to the full strength planned.

The sequence of events and salient features day by day were, very briefly, as follows:

17 September.—By evening, the 101st Airborne Division had landed satisfactorily and was closing on to and clearing the Eindhoven—Grave corridor. The 82d Division had landed satisfactorily, had captured the Grave bridge intact, and was clearing the Nijmegen area, with a strong defense facing southeast towards the German frontier and the Reichswald. The 1st Airborne Division had landed satisfactorily west of Arnhem and was advancing on the bridge.



18 September.—The 101st Division reported that it was clearing the route and the situation was favorable. The 82d Division reported increased pressure from the southeast, and was having a stiff fight to approach the main bridge at Nijmegen. The two bridges over the Maas-Waal Canal were captured intact after hard fighting. News came that the Guards Armored Division was just south of Eindhoven, but was held up.

The second lifts of all three divisions landed satisfactorily, but late in the day owing to the weather in England. The flak had increased, naturally, and although casualties were light, considerable opposition was encountered. This was faced magnificently by the British and American troop-carrier aircraft. For instance, in the Nijmegen area the second lift of 400 gliders for the 82d Division flew in and landed within a few hundred yards of the front-line fighting, but achieved complete success.

By the evening of this, the second day, German pressure was increasng, but the airborne formations were carrying out their tasks according to plan and the breakthrough of the Second Army was being ensured.

19 September.—The 101st Division had done its job. The leading elements of the Guards Armored Division crossed the Grave bridge early that morning and linked up with the 82d Division in the Nijmegen area. The first news of the 1st Division was received, which showed that hard fighting was taking place for the Arnhem bridge, with increasing enemy opposition in that area.

On the arrival of the Guards Armored Division, it was decided, in cooperation with the 82d Division's parachutists, to try to rush the Nijmegen bridge with tanks and infantry as soon as it was possible. Early that afternoon the British-American attack went in, and a grim battle began which lasted throughout the next twenty-four hours.

In the meantime the 101st Division was fighting magnificently with increasing support from advancing British units, and keeping the corridor open for the vital flow of reinforcements.

The 82d Division, in addition to the attack on the Nijmegen bridge, was fighting a hard battle against increasing enemy pressure from the southeast.

By dark on the 19th the Nijmegen bridge was still holding out, but was still intact. It was decided to continue the attack the

next morning, and in the event of its failure a crossing of the Waal west of Nijmegen was to be launched by a parachute regiment of the 82d Division, supported by British and American artillery and British tanks.

The weather, except for the immediate battle area, had broken, and except for a few supplies no third lift could fly in.

20 September.—The renewed attack against the bridge was launched early that morning and continued unabated throughout the day. Early that morning, also, the attack by the parachute regiment of the 82d Division was decided on and was to take place in the afternoon, using British assault boats brought up by the Second Army. A combined attack against the Nijmegen bridge itself was to coincide.

The parachute regiment of the 82d Division launched its attack across the Waal, supported by all the means available. The attack was carried out with magnificent dash and skill in the face of strong opposition, and was completely successful in forming a bridgehead on the north side of Nijmegen. At almost the same time the renewed attack against the bridge from the south achieved success; the tanks of the Guards Division roared across, and the great bridge over the Waal was firmly in our hands.

In the meantime the enemy was still being cleared out of the northern suburbs of Nijmegen, where there was hard fighting, and the pressure from the Reichswald was continuous and increasing.

The 101st Division was still holding open the corridor. A 1st Division report was received, very delayed, that the brigade holding the bridge was cut off and the situation was unknown, but the division still held the ferry west of Arnhem and was holding a perimeter in that area.

The weather, except for the immediate battle zone, was bad, and the air operations could not be carried out—except by the Luftwaffe, which appeared in strength for the first time for many months.

The failure to fly in the last reinforcements of the 82d and 1st Divisions was not a deciding factor, but was a contributory factor in the failure to take advantage of the 1st Division's great fight.

By the evening of this day the Guards Armored Division was having a hard fight south of Elst, which the enemy had strongly reinforced, while efforts were being made to find a way round to the west or east to reach the Neder Rijn.

21 September.—Early in the day, reconnaissance elements of the Guards Armored Division reached the south bank of the Neder Rijn opposite the 1st Division. It was decided to hold a strong eastern flank in the Nijmegen bridgehead, while all available forces were directed west and north to link up with the 1st Division. The latter reported, the message again being delayed, that the situation was deteriorating, its perimeter was being slowly contracted, and relief was urgently requested.

With us, every effort and every resource that became available up the corridor was being directed to reach Arnhem, and by the evening the leading infantry of the 43d Division were on the south bank of the Neder Rijn opposite the 1st Division, but the latter did not hold a beachhead down to the river.

Part of the Polish parachute brigade managed to get through the bad weather and dropped north of Elst, joining up with the forces on the southern bank of the Neder Rijn.

It was decided to get a force across, with supplies, that night, and the task of relieving the 1st Division was given, with all the resources they might require, to the 43d Division, i.e., the only formation available which was not already deeply committed to battle.

In the meantime the Guards Armored Division was to hold the bridgehead, and the 82d Division was to continue clearing Nijmegen, retaining the Nijmegen high ground and preventing, at all costs, any enemy penetration into the flank of the corridor, through that high ground, from the Reichswald.

22 September.—On this day all plans and

efforts were directed to reaching the 1st Division in the north. Early in the afternoon the enemy started shelling the corridor at Veghel, and soon after cut the corridor with tanks and infantry north of the town. The 101st Division was immediately involved in its clearance, and hard fighting ensued.

The weather was still bad, the resupply of the 1st Division failed to reach it in spite of determined efforts by the air forces, and further reinforcements of the 82d Division and 1st Division (which would have gone a long way towards easing the situation in the bridgehead north of the river) failed to fly owing to the weather.

Throughout, the 82d Division was fighting a tough battle against the German threat from the southeast and, with various troops under command which had reached us up the corridor, was holding the whole area, including the bridges, safely in our hands.

23 September.—Plans for a determined effort to reach the 1st Division by assault were in preparation for that night. The 101st Division was fighting hard to open up the corridor, which was achieved by early on the 24th, and the flow of Second Army to the north was renewed.

Still no airborne operations were possible, except for resupply of the 1st Division which was only partially successful.

During the night 23-24 September a portion of the Polish parachute brigade got across the river and joined up with the 1st Division. Resistance was strong, and operations on the south bank opposite the 1st Division, where the ground was completely dominated by the enemy from the high ground west of Arnhem, were difficult in the extreme.

24 September.—Messages received from 1st Division showed an increasing deterioration in the situation, adding the stout-hearted words that resistance would be continued and that they would do their best.

Determined efforts were made during the night 24-25 September to get further reinforcements across the river to the 1st Division and to carry them supplies. This attack was most gallantly carried out by troops of the 43d Division, who got across but met increased resistance and failed to link up with the 1st Division.

The 82d Division, during this period, was beating off continued attacks from the southeast. The division was fighting magnificently and taking heavy toll of the enemy. The 101st Division was still holding the corridor, where considerable fighting was required to drive the enemy back out of shelling range so that a smooth flow of reinforcements and supplies could come up.

25 September.—Early on the morning of the 25th, the decision was taken to withdraw the 1st Division. This was a difficult operation and had to be carried out by the 1st Division breaking through the German defenses around them and getting down to the boats (the latter having been taken across to the north bank by the 43d Division), and all this had to be carried out on ground dominated by the enemy and under heavy shell, mortar, and machine-gun fire.

During the night 25-26 September this difficult and hazardous operation was carried out and was performed so gallantly and well that the whole available force of the 1st Division (certainly a far greater number than was universally expected) rejoined their comrades of the Second Army on the south bank of the river, leaving behind their wounded.

Throughout the whole of the 1st Division operation, the evacuation of casualties, under extremely difficult circumstances, was allowed to take place by the Germans who, except for one instance, behaved in a most correct and soldier-like manner.

The survivors of the 1st Division were brought back to Nijmegen to food, sleep, warm blankets, and new clothes. In spite of their ordeal, after forty-eight hours, when I spoke to them, it would have been hard to tell that this body of troops had fought continuously against the Germans in close contact for eight days. Their morale and confidence were absolutely unimpaired.

During the next few days, the bridgehead

north of Nijmegen was further secured by the leading troops of the Second Army, assisted by elements of the 82d Division. The Nijmegen front and bridges were held secure, and the 101st Division was again in hard battle against the Germans who had this time broken the corridor south of Veghel from the west. This latter was cleared up in forty-eight hours and, except for these two breaks, the corridor was kept open.

On the night of 28-29 September both the Nijmegen bridges were blown up by saboteurs swimming down the river. The road bridge was repaired and open to full traffic in twelve hours, and has since remained intact. Another (pontoon) bridge was immediately put across the river and has been operating since.

In the meantime the flank corps of the Second Army were clearing the right and left flanks and securing them firmly, while the concentration required by the Commander in Chief for future operations was being carried out according to plan. This required the firm retention of the Reichswald front, the corridor and flanks from Grave to Nijmegen, and domination of the bridgehead north of the Waal.

The airborne attack had punched the Second Army through nearly sixty miles of the enemy front, had secured all the bridges except the most northerly, was guarding the Reichswald, and had placed the Second Army in firm bases from which —well, a study of the map will lead one to the possibilities which, we may be certain, the German is also studying with acute apprehension.

The Defense of Warsaw

Translated and digested at the Command and General Staff School from a Polish article by "Drogoslaw" in *Bellona*, monthly publication of the Polish General Staff, London, December 1944.

IN July 1944 the Germans suffered a defeat and were forced to retreat. No serious resistance on their part in eastern Poland was expected, for their reserves in the vicinity of Warsaw consisted of only one Hungarian and two German infantry divisions. Thus, the Germans had to draw from other fronts and transfer to Warsaw their elite armored units, such as the Hermann Goering Division from Italy, the Totenkopf Division from Rumania, and the SS Viking Division from the area south of Lublin.

Despite the great speed of the Russian advance, the German armored divisions managed to reach Warsaw first, prepare for defense, and later inflict heavy losses on the Russians. As a result, the advance of the Soviet armies in this direction was completely stopped and the threat to Warsaw removed.

There was a certain relation between the activities of the Polish Home Army and the war wave approaching from the east. As the Russians advanced, separate units of the Home Army became active in the immediate rear of the German army. Many combat operations were carried out, in which not only single platoons, as before, but battalions, regiments, and larger units participated.

In June 1944 a battalion of the Home Army fought considerable German forces south of Novogrodek. In the first part of July, strong Home Army units engaged retiring German troops in the districts of Lida, Slonim, and Baranowicze. From 6 to 13 July, about two infantry divisions of the Home Army (the 1st and 19th Infantry Divisions) fought for Vilno, established contact with the regular Soviet troops, and occupied the city together with the Russians.

The rapid progress of the Soviet troops, their approach to Radzymin, the establishment of the bridgehead on the west bank of the Vistula, and the evident panic spreading among the German troops, all had influenced the estimate of the situation and the decision of the staff of the Home Army to take and

hold Warsaw. In addition to this, the fortification works in Warsaw had been discontinued, the German labor office in Warsaw had burned its documents, and the city was being partly evacuated. Radio stations from the east called upon the Polish people to fight the Germans, and to cooperate with the advancing victorious units of the Red Army. Leaflets with the same appeal were dropped from Soviet planes.

The strength of the Home Army in Warsaw was about 20,000 armed men, and there were other combat organizations in Warsaw which participated in the struggle. One should also consider the great number of able-bodied civilians constituting the reserve of the first-line troops.

The Home Army units were originally organized in platoons. But after the outbreak of the insurrection, when certain districts of the city had been captured, and even during the fighting, companies, battalions, and regiments were created. These units were later merged to form the Warsaw Corps under the command of Brigadier General Antony Chrusciel.

The 8th Infantry Division of this corps captured and defended the Zoliborz district (northern district of Warsaw), the 10th Infantry Division occupied and held the Mokotow district (southern district), while the center of Warsaw was defended by the 28th Infantry Division. These units had no artillery, mortars, antitank, or antiaircraft weapons. The armament consisted of a limited number of rifles, submachine guns, heavy and light machine guns, and home-made hand grenades, but there was not enough ammunition.

Food supplies came from municipal stocks, captured German stores, and residents of the city. There was not enough food, however, and during the last two weeks the defenders in many sectors were issued whole corn smuggled into the capital in small quantities and at the cost of great effort.

No definite information of the German units in the Warsaw fighting is available. In the beginning, they were composed of police, gendarmes, guards, satellite state units, and Ukrainian SS. At the outbreak of the insurrection, the German garrison of Warsaw included about 22,000 men. These forces were organized in battalions. They were supplied with good weapons and unlimited quantities of ammunition, and were supported by artillery and aircraft and by the army units operating in the vicinity of the capital. During the last stages of the fighting, the Germans employed about five divisions.

It is very difficult to give an accurate report of the fighting because of lack of communication among separate districts and within the districts—between streets and separate blocks.

The uprising in Warsaw coincided in time with the German counterattack undertaken from its outskirts against the onrush of Marshal Rokossovskii's units.

1. Period 1-5 August.—The uprising began at 1700, 1 August 1944, and soon many districts of the city fell into the hands of the attackers.

The Home Army held the Old City, the western part of the capital, parts of the center of the city, the center of Mokotow (southern part of the city), and the railroad stations in Praga [on the eastern bank of the Vistula River opposite Warsaw]. The Germans, however, had succeeded in securing a thoroughfare through the city.

The fighting was fierce and violent. The bridges across the Vistula and the main railroad station changed hands many times with heavy losses suffered by both sides. The Germans finally captured all these points by using tanks.

During the first day of fighting, the Germans drove a large group of men taken from one of the houses ahead of one of their units attacking a Polish fighting group. On one of the streets, they got hold of fifty men and tied them up firmly to tanks used in the attack. On 3 August, attacking our barricades, they drove in front of their tanks several dozen civilians, using them as a shield against our fire.

Those were hard days, and the commander of the Home Army, in his very first telegram to the Commander in Chief, made a request

for antitank weapons, ammunition, and a paratroop brigade.

2. Period 6-18 August.—As the stocks of ammunition were depleted, the aggressiveness of our units diminished.

On 7 August the main effort of the enemy was directed toward the clearing of another thoroughfare across the city. He committed large infantry and sapper forces with artillery and tanks, and finally gained the coveted thoroughfare.

The initiative now shifted to the enemy. In order to clear another thoroughfare leading to one of the bridges, he employed strong forces, including two armored trains, while his artillery supported these operations from Praga.

Hard fighting with the superior enemy, heavy losses, and lack of equipment and supplies from the outside made the situation of the Polish units so critical that beginning with 7 August the purpose of the defense was only to hold on.

As a result of the German operations, Warsaw was cut into a number of isolated sectors.

On 11 August, in an ultimatum to the defenders, the German command demanded surrender. The ultimatum was rejected.

Between 6 and 18 August, as a result of the intervention of the Governments of Great Britain and the United States, several deliveries of arms and ammunition were made. Inasmuch as all our centers of resistance were scattered, the dropping of supplies was very difficult. In five operations, eighty-eight planes, including thirty Polish planes, participated.

3. Period 19-27 August 1944.—Having secured the main communication arteries of the capital, the Germans tried to capture the Old City and keep the capital isolated from the rest of the country. The enemy also attempted to widen the central thoroughfare through the capital.

The following units, besides the police and gendarmery, were used by the enemy in the attack: the 110th Infantry Battalion, two sapper battalions, a Tiger-tank company (nine tanks with 88-mm guns), twenty 75-mm assault guns, fifty "Goliaths," six 75-mm guns, several mortars (including one 60-cm mortar), some flame throwers, and an armored train.

In addition to the forces participating in the main attack, several infantry battalions with tanks and mortars launched a number of secondary attacks. "Stukas" and other planes bombed the areas under attack.

No help from the Russians was received during this period. Systematic burning of the capital by the Germans was a great disaster. Some supplies were dropped by Polish planes. Out of thirty-four planes, only three dropped supplies in the city; the rest of the containers fell in the outskirts. It was extremely difficult to reach the capital during this period. The German antiaircraft defense and fighter planes fought off the supply planes. The smoke from the raging fires made orientation almost impossible.

4. Period 28 August—8 September.—On 29 August the Germans, after an artillery preparation and aerial bombing, forced the Home Army units to abandon the Old City. The loss of this central district isolated the northern district and made the situation difficult.

On 4 September the Germans destroyed the power station and the water works, which made it difficult to extinguish fires raging in the city.

During this period, only one flight was carried out by seven Polish planes.

5. Period 9-28 September.—This was the most difficult time for the Warsaw defenders.

On 12 September Soviet fighter planes appeared for the first time over Warsaw and dispersed the German aircraft. This raid was followed by Soviet planes which dropped arms, ammunition, and surgical supplies.

The Soviet troops attacked Praga, but even its capture could no longer improve the situation of the defenders. The Home Army units established contact with the Red Army and arranged for artillery fire on the western bank of the Vistula.

The Soviet command, however, did not intend to attack Warsaw frontally. An attempt was made to exploit the achievement of the Home Army by establishing bridgeheads on the western bank of the Vistula. About an in-

fantry battalion (from one of the Polish units formed in Russia) crossed the river and joined one of our isolated units. This battalion suffered very heavy losses. A second attempt of the same kind was made in another sector, but after several days of hard fighting the bridghead was liquidated by the Germans.

On 18 September the defenders received great help. It was the American massed daylight raid from Great Britain. Out of 110 Fortresses, 107 reached Warsaw and four were downed over the city. The Fortresses were escorted by a strong fighter force. The dropping was done from a high altitude—three to four kilometers. Only part of the containers fell into the hands of the defenders; the rest fell either beyond the city limits or in areas between our lines and the German positions. There were fights for the possession of these containers. On the whole, the defenders of Warsaw got about 400 containers, i.e., about thirty-five percent of the total dropped. In view of the technical difficulties, this result was considered satisfactory.

The Germans sent in another ultimatum. It was rejected again.

Following this, the Germans committed fresh armored divisions and infantry units. On 23 September, after an artillery preparation and heavy aerial bombardment, the Germans launched an attack from the south, using numerous tank units. The southern city district (Mokotow) was completely destroyed and its ruins fell into the hands of the Germans.

Mokotow fell on 27 September. On the 28th the Germans attacked Zoliborz (northern district) after a fierce artillery preparation. The battle lasted two days, and on 30 September Zoliborz also fell.

According to the German communiqué, armored units penetrated into Zoliborz from all sides and took 2,000 prisoners. In the meantime, the center of the city was completely destroyed by artillery fire and aerial bombardment.

At 2000 on 2 October the last center of resistance fell, and this was the end of the uprising.

The Commander in Chief and Commander of the Home Army, General Bor-Komorowski, and the remnants of the Polish units were taken prisoner. This took place on 4 and 5 October. According to a German communiqué, 11,000 men, including six generals and 942 officers, were taken prisoner.

Conclusions

An uprising of men equipped with small arms against a modern army of the Twentieth Century armed with powerful weapons may seem impossible. But it is not, and this was proved by the Warsaw defenders.

Computations prove that, even during the very first days of fighting, Warsaw needed at least five tons of war materials a day. But during the entire period of fighting, Warsaw received only one hundred tons, or about one and a half tons per day. These figures speak for themselves.

More than two months of tragic struggles with a determined enemy is more than could be required even from a well equipped and modern army cut off from its normal sources of supply.

Battleship and Carrier

An article by Captain Russell Grenfell, Royal Navy, in *The Navy* (Great Britain) December 1944.

THE *Tirpitz* was sunk by RAF bombers in a very gallant and well conducted attack on her in a Norwegian harbor. The bombs used were the huge 12,000-pounders, and the bombing was extremely accurate. Hits were scored on the upper deck of the ship, and there were also near misses which burst under the water close alongside. The ship heeled over and capsized.

It is quite possible that the near misses

were the chief cause of the vessel's destruction. Exploding well under water close to, perhaps almost in contact with, the unprotected ship's side and bottom below the armor, a 12,000-pound bomb would have the force of about ten or fifteen torpedoes, with results that can be imagined. The fact that the ship capsized without blowing up indicates that the magazines were not penetrated, which may mean that the horizontal armor was sufficient to keep the bombs, enormous as they were, outside the ship's vitals. The underwater plating would in any case be the most vulnerable area.

What are the lessons to be learned from this episode? It proves that battleships, however big or strongly constructed, can be sunk by attack from the air. But this is not a new lesson. The *Prince of Wales* and *Repulse* had been sunk in that way in 1941, a battleship of the American Navy was destroyed by aircraft in Pearl Harbor, the *Roma* was blown up by an air missile while on the way to surrender in 1943, and—although we still lack full details from that area—it is probable that Japanese capital ships have succumbed to air attack in the Pacific. What may be new about the *Tirpitz* is that she was destroyed by shore-based aircraft armed only with bombs. Apart from the *Roma*, which fell a victim to a "Chase-me-Charlie" bomb, nearly all the other capital ships concerned went down under a combination of bombing and torpedo-plane attack.

Does this success of the heavy bomb against what was probably the toughest battleship in the world mark a turning-point in naval warfare? In order to frame any sort of answer to that question it is necessary to examine all the circumstances of the case. The first points one needs to note are that it has taken more than five years of war to achieve this particular result and that the previous evidence of these five years is not noticeably in favor of the air bomb, or indeed air weapon of any kind, as a lethal instrument against the big surface ship. Again, leaving aside the American-Japanese fighting for lack of detailed information, the loss of British, German, and Italian capital ships has been due to the following causes:

Royal Oak and *Barham.*—Submarine.

Hood.—Gunfire.

Bismarck.—Gunfire from surface ships, and torpedoes from surface ships and aircraft.

Graf Spee.—Self-destruction following gunfire from surface ships.

Prince of Wales, Repulse, Roma, and Tirpitz.—Various forms of air attack, of which the *Tirpitz* alone was by bombs.

Even without counting the *Graf Spee*, air attack can claim no preeminence in the matter of big-ship destruction.

The third point is that any successful attack must be judged in relation to the state of the defense. If that be defective, even the most powerful ship can be defeated by means that would not otherwise suffice. For instance, in the last war, our British capital ships were in mortal danger from underwater attack by reason of their inadequate subdivision and —in the early stages of the war—lack of bulges. They were correspondingly vulnerable to internal explosion on account of the initial neglect to give them efficient anti-flash arrangements.

From these points of view, it has to be remarked that the *Tirpitz* was motionless in harbor, and had no fighter cover, no smoke screen, and, though there were apparently a few antiaircraft guns on shore, her main defense seems to have lain with her own antiaircraft armament. Her lack of motion deprived her of the power of taking avoiding action, while it relieved the attacking aircraft of the need for guessing the unknown factor of her speed. The absence of smoke also gave them a clear aiming point.

The state of her antiaircraft armament is more conjectural. Her antiaircraft fire seems initially to have been fairly good. What one does not know is whether it might have been better. The ship had been the object of numerous attacks in previous months. Fleet Air Arm aircraft had bombed her severely in the spring, and the RAF claimed to have hit and damaged her twice with 12,000-pound

bombs in the two months before her end. It is therefore obviously not impossible that her fire-control installation was in a damaged condition and below full efficiency when the Lancasters appeared. Be that as it may, the antiaircraft fire did not prevent the attacks coming in, with the result that it was itself quickly put out of action. Eyewitness accounts state that one of the first hits so deranged the *Tirpitz's* antiaircraft equipment that the subsequent attackers met little opposition of any kind.

As it existed, therefore, the defense was clearly quite insufficient for its purpose, the *Tirpitz* being after the first hit practically a sitting target for the bombers; though we should not on that account fail to pay tribute to the high accuracy of the bombing done. The question that remains is whether this inferiority of the defense was special to the *Tirpitz* or whether it should be ascribed to a recently increased power of the offense, the latter possibility implying the creation of new conditions under which we should have to regard the shore-based bomber as having gained a definite ascendancy over the ship.

The key to that question is to be found in the one other defensive element that was wanting in the case of the *Tirpitz*—namely, fighter protection. What difference would it have made had it been available? An examination of the general evidence of the war suggests that the difference would have been considerable and might have been decisive. Reverting to our list of capital ships destroyed by air attack, it is the fact that in every case fighter cover was absent. That also applies to the *Bismarck*, whose end was likewise assisted, if not determined, by air attack.

Conversely, there have been numerous occasions when capital ships with fighter cover at their disposal have braved enemy air attack without fatal consequences. One that comes readily to mind is that of the dash up Channel by the *Scharnhorst* and *Gneisenau*, which were accompanied by a strong fighter umbrella from airdromes on the French coast as they went. They got clear away.

Just as striking was the way the British and American capital ships operated close inshore during the Sicilian, Italian, and Normandy landings. Not that fighter cover must necessarily confer complete immunity. No defense can ever be regarded as invariably proof against attack. The fact remains that the only total losses of capital ships under air attack have occurred when fighter defense has been lacking, while capital ships with fighter cover have taken equal risks without deadly consequences. It seems, therefore, fair to conclude that had the *Tirpitz* had friendly fighters at hand, she would now be afloat.

Not that fighter cover is necessarily all-sufficing by itself. It probably needs the other forms of defense to produce the best results. But the fighter is undoubtedly the keystone of the combination.

Provided, then, that these necessary conditions are observed, there seems no reason to take a gloomy view of the big ship's future. There is so much drama in the idea of David overcoming Goliath that most people tend to interpret any example of the kind in as sensational a way as possible. It is so much more exciting to claim that Goliaths are obsolete and that Davids will be the big shots of the future than soberly to estimate that if the Goliaths would provide themselves with a sling and a stone they would be back in their old position.

There were plently to declare after 1918 that the submarine had killed the battleship. There has been a similar chorus in this war that the aircraft has sounded its death-knell. In point of comparative cost, there was more to be said for the submarine thesis, since one of these vessels costing perhaps £300,000 could dispose of a battleship of over thirty times its value. The disproportion between aircraft and capital ship is not so great. The cost of the Lancasters which sank the *Tirpitz* may have been as high as £3,000,000, or ten times that of a submarine, while their effective life is only a small fraction of that of either surface or submarine vessels. The argument from economy in favor of the aircraft as against the ship is not as strong as is often thought.

Surface ships of some kind we can, as things are now, unquestionably take to be

necessary. If, as is never impossible, they are superseded by some other type of war machine, it will only be because the latter is able to carry out all their functions better than they can themselves. But aircraft, as the popular competitor of the ship, are still a long way from possessing the requisite qualities. They are hampered and limited by weather conditions to a much greater extent than the surface vessel. There is now hardly any weather, even including a thick fog, in which the latter cannot fight an action. There are, however, many days in the year when aircraft cannot operate. It has been stated that the Lancasters which sank the *Tirpitz* had to wait two months for favorable conditions for the attack.

The still unequalled operational reliability of the surface ship gives it a survival value which is unlikely to lapse until aircraft capabilities have considerably improved. But what is meant in this context by the term "surface ship"? Does it mean the battleship; or is there a possibility that aircraft have sufficiently altered the situation that smaller types will be all that is necessary? There are those who already claim that the aircraft carrier has become the core of the fleet and who consequently argue that it has rendered the battleship obsolete. Are they right?

The best way to arrive at an answer is to see what surface ships would be needed to attend on the carrier on the assumption that it is indeed the principal fleet unit. First, it will need some form of antisubmarine screen against the submerged submarine. This calls for destroyers. Cruisers it may not require, since its own aircraft may be able to do the necessary reconnaissance. Where mine fields are to be apprehended, minesweepers will, however, be an essential part of the fleet.

Lastly, there is the question of surface attack. The carrier, unlike the average surface warship, which is ready to fight at any moment and to go on fighting while its ammunition lasts, has many impotent periods. Having no fighting power of its own worth talking about, it is rendered virtually defenseless when its bomber or torpedo planes are away on the attack, when they are landing or while they are refueling and rearming, and in bad weather when they cannot take off. At such times the carrier is an easy prey to any surface vessel of and above the large destroyer class that may get within range.

It must therefore have a surface fighting escort to preserve it intact against surface attack during the times when its own aircraft are unable to give it protection. That inevitably brings the battleship back into the picture. The moment there is any question of surface vessels being needed for surface gun battles, even if only in protection of the carrier, the traditional competition in size is set up which brings larger and larger vessels into being until practical limits are reached or international agreements call a halt to the race.

We consequently seem to be back at very much the same sort of fleet as we have now, whether we regard the carrier or the battleship as the primary unit. And to which should the decision go? Will the battleship of the future be mainly a guard for the carrier? Or will the carrier's main job be to provide air protection for the battleship? The answer to those intriguing questions, I meanly leave to the reader.

German Long-Range Coast Artillery Batteries

Translated at the Command and General Staff School from a German article by Erich Glodschey in *Völkischer Beobachter* 14/15 October 1944.

Now that the long-range naval batteries to the right and left of Cap Gris Nez (see sketch) have fought their last fight, we are able to enter somewhat into detail concerning their significance and nature. At two points between Boulogne and Calais, the French coast juts out toward England. These points are Cap Gris Nez and Cap

Blanc Nez. While Cap Blanc Nez rises 134 meters above the level of the sea, Cap Gris Nez rises but fifty meters. At the latter point, one is closer to the English coast, only thirty-four kilometers away. On clear days one is able to see the coast of Kent from there. When the German battery positions were erected on the Channel strait

in 1940, they had another object besides that of suppressing the movement of enemy shipping through the Strait of Dover. The ports on the southeastern coast of England from Folkstone to Ramsgate—which in the first World War had been important bases for the Channel and southern portions of the North Sea—were to be kept constantly under fire and thus eliminated from the picture.

Through the Todt Organization, these super-heavy naval batteries were made ready in very short order. When it is considered that they fired projectiles weighing a ton or more, it becomes evident that for every battery a whole series of bunkers was necessary, not only for the gun itself with its tube as much as eighteen meters in length, but also for the machinery which moved it, for ammunition, and for the range-finding, fire-control, and observation apparatus. Medium batteries filled the gaps between these major ones. As one journeyed from Calais, traveling from the plains of Flanders long the chalk coast, he first encountered, at the village of Sangatte, the battery of the same name. This battery of medium guns constituted a flank protection for the heaviest of the Channel batteries, the long-range battery "Lindemann" near Cap Blanc Nez, which was named after the fallen Captain of the battleship *Bismarck*. Its three 40-cm guns, at their maximum elevation, could fire one-ton projectiles the enormous distance of fifty-six kilometers. Farther along, at the watering place of Wissant, there was again a medium battery; then, east of Gris Nez, there followed the long-range battery of "Grosser Kurfürst" with four 28-cm guns, which could make connection with enemy shipping as far as the English coast. At Cap Gris Nez itself there was the battery of the same name with three 17-cm guns and, farther west, the long-range battery "Todt" with four 38-cm guns, which carried almost as far as the still heavier guns of the "Lindemann" battery. In the direction of Boulogne, in the vicinity of the suburb of Wimereux, there was the fourth long-range battery, the "Friedrich August," with three 30.5-cm guns which could sweep the western approaches to the Channel strait.

It was only in bitter hand-to-hand fighting that the battery "Friedrich August" went down on 18 September, and ten days later, the battery "Lindemann," which toward the end had continued to fire on England with a single gun. The artillery group on Cap Gris Nez then continued to fight as an independent fortified position till 30 September.

Prelude to D-Day

Digested at the Command and General Staff School from an article in *The Army Quarterly* (Great Britain) January 1945.

THE purpose of this article is briefly to describe the process by which formations and units were brought forward from their location in the United Kingdom, sorted out into ship and craft loads, embarked, and despatched, initially to take part in an opposed landing, and subsequently, with the minimum interference to tactical unity, so that they could take their place in the battle shortly after arrival.

These tasks were primarily movement problems, and as such they devolved largely on the Deputy Quarter Master General (Movements) War Office, the Director of Movements Air Ministry, and the Chief of Transportation, European Theater of Operations United States Army, working together in the closest cooperation with the Admiralty and the Ministry of War Transport, to meet as far as was physically possible the operational requirements of the Supreme Commander.

Important as this aspect was in the organization required to move our Army overseas, mention must also be made of those who worked without ceasing to complete the reception arrangements required for a continuous flow of formations and units from concentration areas through the marshalling and embarkation areas; with all the consequent problems of cooking, exchange and issue of equipment and vehicles, waterproofing of vehicles, issue of rations, medical facilities, pay, and a host more.

To the smooth working of the organization which had to be set up to handle all these, credit must go to the administrative staffs of the commands, districts, and sub-districts concerned.

The essential condition to the success of any amphibious operation is the delivery in fighting trim of the right men with their equipment and supplies, in the right place and at the right time; and though, once the force has embarked, the ultimate responsibility for this rests with the Navy, the Senior Service cannot fulfil its function unless the embarkation and loading of the ships and craft entrusted to its care have been carried out on time and with meticulous accuracy to meet the tactical plan not only in regard to their contents, but also in regard to the posting of individual men, vehicles, and stores in the vessels so that they can disembark or be discharged in the order in which they are required.

Some measure of the task with which the joint British Movement Control and United States Transportation Corps organization had to deal is evident from the following brief statistics:

British

Period	*Personnel embarked*	*Vehicles loaded*	*Stores loaded Tons*
D —26 to D —12	.....	.....	95,200
D —11 to D — 1	154,000	23,000	19,300
D to D +24	322,000	65,100	333,500

It is interesting to note that the numbers of British personnel and vehicles in ships or craft on D minus 1 corresponded closely with those shipped to France during the first four weeks of the war.

American

Period	*Personnel embarked*	*Vehicles loaded*	*Stores loaded Tons*
D —26 to D — 12	------	-----	108,200
D —11 to D — 1	133,000	18,200	
D to D +24	320,000	67,400	284,900

The first phase of movement in the operation was the assault and immediate follow-up. This was meticulously planned well in advance in accordance with tactical considerations. Every man, vehicle, and ton of stores or supplies was allocated to particular landing craft or ships for loading at a predetermined point and time, and for discharge on the far side in a particular order.

The second phase—the build-up—differed

from the assault and follow-up in that it depended on the repeated use of the same craft and shipping. A flexible system of movement control was absolutely essential. It had to be capable of meeting at short notice the operational requirements of the Force Commander; the movement was a race against time, liable to be affected by enemy action, casualties in craft, weather, and other unpredictable contingencies. To achieve this flexibility, there was established at Combined Headquarters a Build-up Control (BUCO), on which the Chief of Transportation, European Theater of Operations United States Army, was represented by Movement Control (United States), and DQMG (M) [Deputy Quarter Master General (Movements)] War Office and D. Mov. [Director of Movements] Air Ministry were represented by Movement Control (British). It was the function of Movement Control to work out each day's loading of craft and ships in accordance with the naval forecast of availability of shipping and the Force Commander's requirements in priority, and subsequently to call forward the units for embarkation.

The principle by which smoothness and flexibility of movement were achieved lay in dividing the process into three clear-cut stages; concentration, marshalling, and embarkation.

During a period of several weeks before D-day, formations and units were assembled in concentration areas in southern and southeastern England. Here administration was carried out under formation arrangements. Formation commanders made their preliminary preparations for movements as laid down by the War Office, Air Ministry, and European Theater of Operations, United States Army, assisted where necessary by Command and District Movement Control. Such necessary procedure as the marking and loading of vehicles, the disposal of surplus stores and equipment and of residual personnel and vehicles, and the preliminary waterproofing under the supervision of REME [Royal Electrical and Mechanical Engineers] had to be carried out at this stage.

Some indication of the magnitude of the problem which faced the REME organization will be gathered from the following facts. First, much research had to be undertaken in connection with waterproofing vehicles, a subject in its infancy a year ago; and then instructors had to be provided to work with formations and units concerned. Waterproofing was undertaken in three stages, in the concentration areas, in the marshalling areas, and in the embarkation areas, and as each stage was completed REME "checkers" examined every vehicle. As far as possible, waterproofing was done within formation and unit resources. This, however, was quite inadequate, and the War Office had to provide over 3,800 men who were working continuously for the four months prior to D-day on waterproofing alone. It is interesting to note that 950,000 man hours were spent in waterproofing reserve vehicles.

Movement from concentration to marshalling area was by road or rail, under instructions issued by Movement Control.

On arriving in the marshalling areas, the identity of units was temporarily submerged because they were marshalled into ship and craft loads, or formed into unit parties and joined to parties of other units to make up composite ship or craft loads. For each craft or ship load an Officer Commanding Troops was appointed; and the waterproofing of vehicles was completed.

The administrative arrangements in the marshalling areas were carried out by a static administrative staff, including detachments of the services, found for the most part from formations and units not included in the earlier stages of the build-up. This staff, in conjunction with representatives of Movement Control, were responsible for the final preparation of personnel and vehicles for embarkation. Their responsibilities were very great, and the smooth functioning of the marshalling areas was the result of many months of detailed planning and preparation.

Units remained in the marshalling areas

from twelve to forty-eight hours, and as they were not self-supporting, it was necessary to provide "hotel" facilities. Complete units were made the "landlords" and administered to the troops passing through. This was considered more economical and less disturbing to the Home Army than creating special units under new headquarters to function for a relatively short period before being disbanded. In these areas, hot meals were provided at all hours of the day and night by a small army of over 2,000 cooks; while in one command alone, NAAFI [corresponds to our Post Exchange] established 700 institutes and eighty-eight mobile canteens; in addition, entertainments and various forms of recreation were provided. Emergency rations, landing rations, water sterilizing outfits, etc., were issued in these areas, and among the many administrative responsibilities, the following should be mentioned: supply of petrol, oil, and lubricants; water supply; treatment and evacuation of casualties; replenishment of ammunition; replacement, where necessary, of personal, G. 1098 [Table of Equipment], and organizational equipment; vehicle recovery and replacement; medical facilities; collection of salvage; security measures; traffic control; pay, issue of special currency; issue of life-belts, vomit bags, and seasick remedies.

These duties absorbed men equivalent to rather more than three divisions. It should be mentioned that this figure was increased by nearly 2,000 men employed solely in delivering reserve vehicles.

Under the supervision of Movement Control Representatives, all unit documentation had to be completed and verified in the marshalling area, the principle underlying embarkation documentation being that no man (or vehicle) should sail without a record being kept of the craft or ship in which he sailed, so that in the event of any vessel being lost at sea, an accurate list of those on board would be available. Finally, the most elaborate security precautions were taken, and marshalling and embarkation areas were virtually sealed off from the outside world. Rigid censorship was imposed throughout southern England.

Movement from marshalling area camps to embarkation points was by march route or in road convoys comprising one or more craft or ship loads. Routes were clearly marked by direction signs, and traffic control personnel were at hand to assist convoy commanders where necessary. In each embarkation area was an embarkation regulating park (ERP), where a halt of up to three hours might be necessary. Here a static staff issued hot drinks, and Movement Control checked embarkation documents. A medical staff was available to deal with any casualties.

Under the instructions of the Embarkation Staff Officer (ESO), personnel and vehicles were called forward from the ERP and, after consultation with the Naval Hardmaster, the ESO ordered their embarkation.

The above brief account of the organization required before and during the assault and build-up phases of the operation is necessarily sketchy and incomplete, but it is hoped that it may at any rate throw some light on the extremely intricate "Q" [Supply Section] organization that was an essential preliminary to the early stages of the campaign in northwest Europe.

Use of the Feint in Artillery Preparation

Translated at the Command and General Staff School from a Russian article by Major G. Menshikov in *Krasnaya Zvezda* (Red Star) 19 September 1944.

THE feint in artillery preparation usually has a double purpose: first, to get information concerning the location of enemy fire means, namely, mortar and artillery batteries; second, to draw the local reserve of the enemy toward the front line. All this is done in order to subject his fire means and manpower to the devastating blow of the real artillery preparation.

The feint in artillery preparation is con-

ducted in the following order. The attacker carries out an artillery preparation similar to the preparation preceding a real attack. Then the infantry engages in a demonstration action and with characteristic energy launches an attack on the enemy positions. The basic plan of the feint in the infantry attack should not differ from that of a real operation but, inasmuch as both the artillery preparation and the attack are not real, it is quite natural to employ only part of the available forces.

The secret of success lies in the suddenness of the false artillery preparation and in the skill of the infantry units engaged in the demonstration.

The defender who does not know the intentions of the attacker finds himself in an unfavorable situation. Under the pressure of circumstances, he will assume that both the artillery preparation and the attack are real and will disclose the location of his fire means to the attacking infantry. A little later, all the batteries so discovered are taken under the fire of the attacking side.

The enemy will not limit himself to mortar and artillery fires only. To repel the attack, he will also be forced to bring his local reserves to the forward edge. Therefore, the second and most important mission of the attacker is to destroy the reserve by massed fires during the actual artillery preparation.

It goes without saying that the execution of feints requires proper organization of the cooperation between infantry and artillery as well as skill on the part of each of these arms. A good example of such cooperation and of the excellent training in such actions can be found in the operations of the "X" Division in a battle on the approaches to East Prussia.

Forcing the Neman on a wide front and advancing westward, our troops ran unexpectedly into a well fortified defensive zone. No enveloping or turning movement was possible in view of the continuous character of the German positions. Under these conditions, there remained only one thing to do—to launch a frontal attack in order to break through the defense. But the preparation for the breakthrough might be delayed, since it was necessary to study the German defenses and their fire system. Any delay could affect the general situation unfavorably.

Thus, the attacking troops had to breach a position with which they were not very familiar. Considering the situation, the command decided on the false artillery preparation of the attack.

It was carried out on a narrow sector and lasted twenty minutes. All the mortars and the entire artillery of the unit, with the exception of guns detailed for direct firing, participated. At the beginning of the artillery preparation, the enemy's fire means remained silent; but he could not resist the temptation to inflict losses on our infantry. In about fifteen minutes the Germans laid a powerful artillery concentration on a sector of the expected assembly areas for our forces. The Germans used heavy machine guns and regimental artillery guns. Their special barrage batteries came to life, too. But the German concentration hit an empty spot—we had taken into account all such methods favored by the Germans. And of course our artillerymen located all the targets which disclosed themselves by their fire.

Having taken the false attack for a real one, the Germans disclosed the positions of their fire means prematurely, and brought up their reserves preparatory to counterattacks. Without knowing our plans, they were easily fooled once more. At the very moment when the Germans were about ready to counterattack, our actual artillery preparation began.

Our heavy batteries pounded the enemy artillery and mortar positions, while our light artillery and rocket gun units fired on the hostile infantry concentrated for counterattack. At the same time, our regimental guns neutralized machine-gun nests located on the forward edge.

This furious firing raged for thirty minutes, destroying the matériel and manpower of the defense. The assault, launched by our infantry after the artillery preparation, developed successfully and almost without opposition by the enemy. Sweeping through the German positions, the attackers saw hundreds of dead bodies of German soldiers. The few survivors were completely demoralized. The enemy lost

1,000 killed in this battle, while 200 German men and officers surrendered. Almost all the artillery pieces were captured by the attackers.

Deceptive artillery preparation should not be used according to one and the same pattern in all cases. It is of utmost importance to consider, in each separate case, the terrain and the defensive tactics of the enemy. In the plan of deceptive artillery preparation, each measure should be tactically sound. The planning itself calls for a mastery of tactics, and it is well known that tactics does not tolerate triteness.

Japanese Aircraft

Digested at the Command and General Staff School from an article in *The Aeroplane* (Great Britain) 24 November 1944.

WHEN Japan entered the war three years ago with the surprise carrier-borne aircraft attack on Pearl Harbor, the quality of her air forces was not considered to be good. The belief that the Allies would meet no serious opposition from Japan in the air was the result of a propaganda campaign which had been conducted in Japan for many years before the war. Probably no other nation is so "security minded" as Japan, where the slogan "Every Foreigner is a Spy" has resulted in an almost complete lack of up-to-date information coming from the "Land of the Rising Sun."

Three years of war waged against Japan, to a large extent in the air, have shown how seriously we underrated the Japanese Army Air Force and, to an even greater extent, the Japanese Naval Air Service. The old fallacy that Japan was a copyist, that all her aircraft were cribs of European and United States designs, has been disproved. Instead, circumstances suggest that on the foundations laid down by the British Air Mission of 1922 has been built an efficient aircraft industry.

The New Air Forces

Although her aircraft were good and her pilots well trained, Japan quickly discovered that, in action against Allied forces, several defects were obvious, and consequently she was suffering severe losses. A feature of the airplanes with which the air arms of the Japanese Army and Navy entered the war was the lightness of construction. Results of this lack of weight were extreme maneuverability and good speeds achieved on comparatively low-horsepower motors; but to gain this lightness, such necessary "refinements" as armor and self-sealing fuel tanks were sacrificed, giving rise to vulnerability under the heavy weight of fire of Allied fighters. Armament was also found to be insufficient, particularly in fighters. Consequently, during 1942 the decision was taken to introduce a complete new series of airplanes, incorporating in their designs the improvements found necessary for successful combat with Allied types. The results of this plan are now becoming apparent, and what is virtually a completely new edition of the Japanese Army Air Force and Naval Air Service has recently appeared.

Many new Japanese airplanes have gone into action recently—good airplanes, which in sufficient numbers could constitute a serious threat to the air superiority which the Allies at present hold in the Pacific. One of the most important developments is probably the Homare 21, a two-row, 18-cylinder motor which develops approximately 2,000 horsepower. Its diameter of 46½ inches compares with the fifty inches of the 1,600 BMW 801 and the fifty-two inches of the 1,600-horsepower Bristol Hercules XVI. The Homare 21 gives the new reconnaissance monoplane, Myrt (Figure 1), a top speed in excess of 390 miles per hour; a remarkable achievement. Among the new fighters, Jack (Figure 2) is outstanding; there is good reason to believe the top speed of this radial-motor monoplane is well in excess of 400 miles per hour, while an emergency rate of climb of 4,600 feet per minute can be achieved. Among the new

bombers, Liz (Figure 3) appears as the first Japanese four-motor "heavy," and Sally, Betty, and Dinah are all flying in improved forms. Frances (Figure 4), newest of the torpedo-bombers, is remarkably clean for an airplane of its type and is one of the first Japanese aircraft to carry a torpedo internally.

Most of these new Japanese airplanes compare favorably with current Allied types, and will undoubtedly prove formidable opponents if they are allowed to get into the air in any numbers. At present the Japanese Air Forces are suffering severe losses on the ground from Allied bombing. With the war in Europe drawing inevitably to its close, we may expect to see a steady transfer of Allied air might to the Pacific area. Japan will be crushed as surely and completely as Germany has been and is being. A complete understanding of the strength of our foe will, however, considerably hasten that end.

FIGURE 1.

MYRT.—POWERED BY THE 2,000-HORSEPOWER HOMARE 21 MOTOR, MYRT, SHORT FOR MYRTLE, IS A NEW JAPANESE RECONNAISSANCE MONOPLANE.

FIGURE 2.

JACK.—BEARING A STRONG RESEMBLANCE TO THE EARLIER TOJO AND NAMED "THUNDERBOLT" BY THE JAPANESE, JACK IS THE LATEST JAPANESE NAVY FIGHTER.

FIGURE 3.

LIZ.—FIRST JAPANESE HEAVY BOMBER IN THE FOUR-MOTOR CLASS, LIZ APPEARS TO BE RATHER A CLUMSY DESIGN AND IS PROBABLY NOT UP TO THE STANDARD OF CONTEMPORARY ALLIED BOMBERS. BELIEVED TO BE DESIGNED BY MITSUBISHI, LIZ IS AT PRESENT ONLY IN USE WITH THE NAVAL AIR SERVICE.

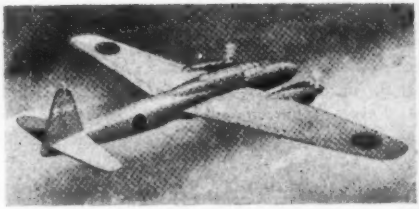


FIGURE 4.

FRANCES.—A JAPANESE TORPEDO-BOMBER OF VERY CLEAN DESIGN, WITH INTERNAL HOUSING FOR THE TORPEDO. FRANCES APPEARS TO BE A MITSUBISHI DESIGN.

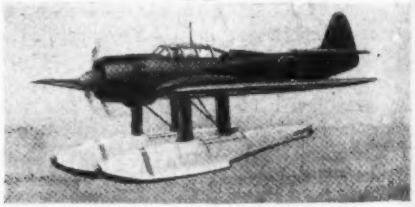


FIGURE 5.

PAUL.—DIFFERING BUT LITTLE FROM AN EARLIER DESIGN KNOWN AS THE EXPERIMENTAL X14, PAUL IS A JAPANESE TWO-SEAT RECONNAISSANCE FLOATPLANE WITH DISTINCTIVE FIN AND RUDDER SHAPE.

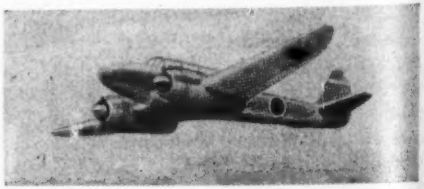


FIGURE 6.

IRVING.—ONE OF THE LATEST JAPANESE ARMY FIGHTERS, IRVING APPEARS TO BE AN IMPROVEMENT OF THE EARLIER NICK. EXISTING IN TWO VERSIONS, IRVING IS USED AS A FIGHTER-BOMBER OR A NIGHT FIGHTER. IN THE LATTER FORM, IT IS COMPARATIVELY HEAVILY ARMED WITH 20-MM CANNON AND MACHINE GUNS.

Nomenclature

The Japanese system of designating their aircraft was quickly found by the American forces to be unsuitable for recognition purposes, and consequently the habit grew up of calling the "meat-balls" by boys' or girls' names. Towards the end of 1943 the system was adopted officially and enlarged, and the following three rules were applied:

All Japanese fighters and fighter-bombers should be given boys' names.

All Japanese bombers, reconnaissance bombers, and torpedo-bombers should be given girls' names.

All Japanese transports should be given girls' names beginning with "T."

During the past two years this system has been adhered to and mark numbers have been applied to the "code" names on a similar basis to British mark numbers.

With the recent appearance of the many new Japanese airplanes, a slight adjustment has been made in the code-name system, the names now including the Japanese model number in place of the mark number. This model number consists of a two-figure numeral, the first figure indicating the airframe change and the second figure the engine change. Thus, Zeke 32, which was formerly known as Hamp, indicates the third airframe and second motor change of the basic design.

Medical Role of RAF Transport Command

An article in *The Royal Air Force Quarterly* (Great Britain) December 1944.

RAF TRANSPORT Command activities are now world wide, carrying freight and passengers on trunk routes and to all operational theaters. In view of this, our RAF medical services have not been slow to take full advantage of these services.

Transport aircraft are of inestimable value for carrying to inaccessible places foodstuffs necessary for health, such as green vegetables and fresh meat. They also carry blood and urgent medical stores over distances where rail and sea transport would be too slow.

One of the most valuable lifesaving uses of transport aircraft is the evacuation of casualties. Patients have been carried by air from the earliest days of aviation. In this war, small-scale air evacuation was carried out in the Iraq rebellion, when Habbaniya was surrounded and patients were evacuated by old Vickers Valentia troop-carriers, which took off from no-man's land under the guns of the rebels just before dawn each day.

Air evacuation of casualties was also used in the Syrian campaign, but its large-scale use was developed in the Western Desert.

In the early stages, air ambulances marked with the Red Cross of Geneva, and supplied by Australia and the Union of South Africa, were employed. These aircraft worked together as a team, under the control of the commanding officer, "No. 1 Australian Air Ambulance Unit." This unit evacuated many thousands of casualties and sick from the battle areas, and operated with the 8th Army into Italy.

In the Western Desert they flew to and from forward areas and, when Sicily was invaded, during the battle of the beaches these aircraft again went in to collect 8th Army casualties.

But the "Air Ambulance" proper carried only a small proportion of the casualties in the Western Desert, Sicily, and Italy. The larger transport aircraft, flying longer distances and at greater speeds, performed the bulk of the work.

Air transports, taking personnel and freight to the forward battle areas, might often return empty, and the RAF medical services took advantage of this. In conjunction with the Army medical authorities, they arranged a system whereby loads of casualties were always ready for the transport aircraft arriving in forward areas with their pas-

sengers and freight. No transport aircraft was allowed to return empty.

Over 10,000 casualties and sick were evacuated by Royal Air Force transport aircraft between El Alamein and Tunis, and in all, during 1943, Transport Command aircraft carried over 16,000 sick and wounded for treatment at base hospitals.

Aircraft no longer seek the protection of the Geneva Red Cross so that they may be free to carry ordinary passengers and freight, and so every aircraft used by Transport Command can be equipped for the carriage of casualties. On its journey to an operational theater, it will carry food and war materials. For its return trip, it can be rapidly converted to an air ambulance, with stretchers carried on neat racks, which take American as well as British stretchers. A nursing attendant with full facilities to attend to the requirements of all the patients is also carried.

However, owing to the risks of enemy activity and bad weather, air evacuation of casualties cannot always be relied upon, and the older system of evacuation by road, rail, and sea is therefore maintained.

If enemy air opposition is strong, the Royal Air Force commander in the field will forbid the use of transport aircraft unless he can afford fighter cover, so reducing the risk of these aircraft being shot down when they are carrying sick and wounded.

The advantages of air evacuation of casualties are indeed great. For instance, the soldier, injured in the front line, is transported to the base hospital where specialist facilities exist, in the shortest possible time. Another great advantage is that air evacuation of casualties frees the main road and rail facilities on the Army lines of communications from the extra burden of returning road ambulances and hospital trains, thus allowing quicker transit of troops and urgent war materials to the front line. Again, the number of medical personnel and ambulance drivers employed on casualty evacuation is materially cut down.

In tropical areas, where the lines of communications may run through jungles and swamps, and disease incidence is extremely high, the evacuation of casualties by air saves them from the extra risk of malaria and other diseases which are prevalent.

Finally, the morale factor is extremely important, and experience has shown that the soldier going into battle is greatly comforted to know that if he is wounded he will have a quick and comfortable trip back to base.

To ensure that the facilities are fully utilized, Transport Command have placed medical units, trained in all problems of casualty air evacuation, at all the important termini of trunk routes throughout the world. They also have specialized mobile units which go forward with the Army in operational theaters. These are known as "casualty air evacuation sections" and are equipped to house and feed casualties awaiting air evacuation, as well as rendering any necessary medical attention.

The RAF medical services have more than a thousand RAF and WAAF nursing orderlies trained in air ambulance duties. It is interesting to note that the WAAF have volunteered in equal numbers to the men.

"Goodenough Bluff"

Digested at the Command and General Staff School from a booklet, "The Jap Was Thrashed," published in Australia by the Director General of Public Relations under the authority of the Commander in Chief, Australian Military Forces.

WHILE Australian troops were driving the Japanese back through the Owen Stanley Ranges in October 1942, a small force of Australians—some of the victors of Milne Bay—seized Goodenough Island (see sketch).

The first action was not, however, comparable with the greatest bluff of the Pa-

cific war which was put into effect on the island a few months later.

Few troops could, at that stage, be spared to garrison the island, which in enemy hands could have been used as a staging area for another attack on Milne Bay. So a "ghost" force was maintained there, and they completely bluffed the enemy. The story can be told now because the shortages of men and equipment have been overtaken.

The "Goodenough Island Deception Scheme," as it became known, was a masterpiece of organization and deception. It was a most ambitious scheme to mislead the Japanese into believing that we had at least a brigade on the island, whereas it was held by less than a battalion.

Mountains rising to 8,500 feet form the greater part of Goodenough. Jungle-clad for the most part, they are reputed to be the highest in the world on an island as small as Goodenough. Although only twenty-five miles long and fifteen miles wide, the island had great strategic value as an air base for the bombing of New Britain (it later became an important Royal Australian Air Force fighter base), as an air base for the protection of Milne Bay, and finally to provide air cover for naval movements along the north coast of New Guinea.

With the Japanese strongly holding New Britain, it was considered that he might attempt a second attack on Milne Bay. In this event, the potential air bases at Goodenough could, if in his possession, be developed for offensive sweeps against Milne Bay. It was decided, therefore, to occupy Goodenough with a battalion of infantry, less one company. The battalion's objective was to "eliminate the Japanese force on the island—estimated to be about 300—and deny him the use of it."

The force sailed in destroyers from Milne Bay and disembarked on the southern tip of Goodenough during the night of 22-23 October. The task force was divided into two forces, one concentrating at Mud Bay on the east coast, and the other at Taleba Bay, on the west coast.

Although one phase—the extermination of the Japanese force—was not successful, the second was carried out. We established ourselves on the island, and the enemy was driven out. In all, thirty-nine Japanese were killed, but it is not known how many were wounded.

The 2/12th Battalion now had the role of occupation troops, and to assist in the construction and defense of air strips. At the end of December, the battalion returned to New Guinea.

Goodenough Island then was garrisoned by

even fewer troops, and the "Deception Scheme" was conceived and planned, to be carried out early in 1943. It called for ingenuity and imagination on the part of those who were to do the actual deceiving. The object was to mislead the Japanese into believing that the Australians had carried out from Milne Bay a movement of a full infantry brigade group, which had occupied Goodenough. At the time, the island was, in fact, held by only a company of infantry and attached troops.

The cost of material used in the scheme was negligible, and once it was in operation it was kept going by a handful of Australian troops and a few score natives.

While everyone is familiar with the simpler forms of camouflage, most civilians and even many members of the services have little idea of the wide and often brilliantly conceived use that has been made of deceptive camouflage.

Deceptive camouflage in city and town areas was a relatively easy matter, as materials were close at hand, but real ingenuity and improvisation were necessary for deceptive work in the field. The Goodenough Island scheme needed both.

The first role of the men on Goodenough Island was to hold an emergency landing strip to the northeast of the island. The secondary role was the deception scheme.

It was not sufficient merely to establish a large camp on the island. There had to be some realism about it. You cannot have a brigade on an island without first moving it there. So all cargo ships that could be spared for the work were concentrated in Milne Bay, taken to the wharves in daylight for the Jap to see, if he wished, left there long enough for the loading of stores and men, and then taken out in convoy and with fighter protection to Goodenough Island. These ships carried not thousands of men and the stores necessary for a brigade, but old wooden packing cases, empty petrol drums, camouflage paint, sheets of tin, hessian, timber, old tents and mosquito nets, and the many odds and ends from which the guns and tanks and trucks and kitchens were to be constructed.

For several days and nights these ships plied backwards and forwards between Milne Bay and Goodenough Island, always with fighter cover. But the fighters knew their work and saw to it that the Japanese reconnaissance planes had a good look at the ships.

The camps began to take shape on Goodenough Island. Areas were cleared of grass, tents were set up, kitchens were built, dumps established, slit trenches dug, tracks cleared, weapon pits rigged. Coast defense guns appeared on headlands. Bofors guns pointed skywards. Barbed wire lined the open beaches and ringed the camp areas. Smoke rose from the kitchens. Washing hung out on the lines by the tents.

Apparently a full brigade had taken up its position along the eastern side of the island. But the tents were empty of men, the kitchens were useless skeletons, the dumps were old packing cases, the guns could not be fired, the tanks would not move. There was no brigade in that series of camps—just one company, scattered widely, and a few score natives.

All the camps were sited in comparatively open country alongside jungle growth, to give the impression that the tents and other objects that could be seen from the air represented only the fringe of larger encampments in the trees.

The kitchens were flimsy structures of wood and hessian with a few old coppers and water tins outside. But fires were lit in every kitchen every day.

The dumps were piles of old cases and tins partly covered with tarpaulins. Some were primed with petrol and oil and dry vegetation, and were wired so that they could be set on fire immediately if a bomb fell anywhere near them.

The dummy trucks and reconnaissance cars were strange affairs of hessian tacked on wood. The shape was faithful and paint gave them a more realistic appearance. Wheels set a problem. Tops of 40-gallon petrol drums were used, and though absolutely unconvincing on the ground, they probably would have deceived the aerial camera at usual reconnaissance height.

The tanks also were made of hessian on a

wooden frame. From a hundred yards, or less in indifferent light, they could not be distinguished from the real thing.

Machine-gun carriers were parked at various places on the border between jungle and grassland; heavy tracks leading to them were kept fresh by chipping off the grass or running heavy vehicles in occasionally. The carriers were camouflage netting, heavily garnished, draped on wooden frames.

The 25-pounders were most convincing —again made of wood, tin, and hessian. They were set in sunken emplacements correctly sandbagged, trenched, and netted.

One Bofors "gun" which was particularly realistic was sited on a point of land jutting cleanly out of coconut palms and commanding a wide stretch of bay. The gun could be traversed or elevated by a simple rachet device.

Dummy Bren guns were made of wood and mounted for ack-ack use on wooden stands.

Light-colored sand was tossed over the spoil from trenches, to attract attention, and when trenches were dug in light-colored soil, old oil was poured into them to exaggerate the appearance of depth. In this way, trenches only a few inches deep could be made to appear feet deep.

Natives were used at all these positions to keep the grass short to give the appearance of constant use. This was not easy. The grass grew at an amazing pace, and burning it off only accelerated the growth of new grass. Constant cutting became necessary—a time-taking and laborious job in a land where grass grows in a few weeks to a height of eight and ten feet.

Vehicle tracks were made first with tractors. Then the natives were set to work with knives chipping off the young grass as it grew, to give the tracks the appearance of constant use.

One of the simplest and most effective deceptive devices used was the apron "barbed wire." Wooden stakes replaced metal, and thin jungle vines replaced genuine wire. From fifty yards this "wiring" was indistinguishable from real wiring. It was erected on open beaches, and around all battalion and company areas and dumps and gun positions. It was placed wherever wire could normally be expected, and road blocks of wood and vines were placed at obvious positions.

By one creek a water point was left clearly visible from the air. The tank was set on stout foundations and it was the real thing up to the point where it needed a tap and pump. A bent sapling was used for the pump.

Tents were mostly a single fly supported by poles, ridge pole, and guy ropes. Wherever the front of a tent was open to the inquisitive eye of the oblique aerial picture, dummy beds were set up and old mosquito nets were rigged. The tops of jam tins were tacked to trees outside to look like shaving mirrors. Washing and blankets were hung on a clothesline, the natives changing the washing—old shirts and slacks—from tent to tent each day.

One of the greatest difficulties in the scheme was to give the appearance of movement and life about the camps. With few men available, it was not possible to do much in this way. The smoke from fires and the occasional changing about of various objects was the best that could be done, but one simple device used was to hang bits of unrusted tin in trees so that they would flash sunlight into the sky. These flashes would give the impression of movement.

These were all essentially ghost camps holding something of the air of mining camps that were dead. Empty tents, empty beds, unused kitchens, roads that never felt the tires of vehicles, and vehicles that never moved—yet these ghosts played a part whose true importance no one will ever know.

My wars were bold, but methodical. The art of war lies in sometimes being audacious and sometimes very prudent. Generally, the most timid course is the poorest.

—Napoleon

Troop Carrier Airborne Operations

An article by Major General Benjamin F. Giles, Commander of United States Forces in the Middle East, in *Aim*, army magazine of the British Middle East Command, No. 31, November 1944.

THIS war has developed mobility of mind and body as well as that of armor and supplies, a mobility that made possible the landing of thousands of planes and gliders when France was invaded. Neither ocean, channel, nor land fortification can stop such a paramount element of a task force.

Wherever there is a job of fighting to be done, it is common practice today to organize and train a task force to do that particular job. The task force may vary in size from a few thousand men to several hundred thousand. Large task forces are composed of all branches of the armed forces—ground, sea, and air; all organized under a single commander. Battle experience clearly indicates that no one arm of the service is supreme or more important than another; all do—and must—work as parts of a team. Such a force may contain troops from all the Allies. The particular job will indicate the preponderance of any one arm of the service. Flexibility, mobility, and striking power combined are the keynotes to success to all task force commanders regardless of size.

Troop carrier airborne forces are without doubt our most flexible forces today. Neither mountains, swamps, nor wide rivers are barriers to such a force. Troop carrier forces give the commander a weapon of extreme mobility and with fire power placed exactly where needed and when needed. However, the employment of such forces requires a tremendous amount of prior and detailed planning, as well as carefully supervised and exacting training. The troop carrier airborne operations during the present war have not always been successful. A study of failures has been made and the reasons for the failures determined. Experience has shown clearly that the following general principles of employment of troop carrier airborne forces must be observed to ensure successful operations in battle:

a. The mission should be one that necessitates the use of troop carrier airborne forces to accomplish.

b. The supreme task force commander only should assign the mission to the troop carrier airborne forces.

c. Troop carrier airborne forces must be considered in the initial stages of planning for the task force as a whole.

d. Joint training directives for the troop carrier airborne forces must be issued far enough in advance of operations to allow detailed joint training and planning by these units for the particular operation.

A well-trained troop carrier airborne force can and must be able to fly in mass formations on dark nights, follow accurately prescribed routes, and be absolutely positive in finding specific objectives. Units thus trained are capable of operating under all conditions of weather and visibility that other aircraft can operate under.

The author had the honor of organizing and training the Ninth Troop Carrier Command as part of the Ninth U. S. Air Force during the period from October 1943 to March 1944. The higher commanders, both British and American, were keenly interested in the joint planning and training of troop carrier airborne forces for the invasion of France. Every facility was placed at our disposal to further the necessary training. As previously stated, the results certainly justify the time and effort that was spent in the joint planning and training.

For the invasion of France, a tremendous troop carrier airborne force was organized in England. All of the principles set forth above were religiously carried out in the planning and the training of this force. The splendid results we all know. Several months were devoted entirely to detailed planning and joint training. Time and space factors were elements that had to be considered. Routes to and from the objective were carefully laid out

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with proper aids to navigation, and all friendly forces were made thoroughly familiar with these routes. Supply problems had to be solved, and a great number of other details given careful planning and consideration. Most important of all, however, was the time devoted to joint training of the two forces—the one being transported and the one doing the transporting. Numerous large-scale maneuvers, in which all ranks joined with a will, were carried out under conditions paralleling those expected during operations.

Valuable lessons were learned during the recent operations in France. These will improve future operations of troop carrier airborne units.

It is the opinion of the author that troop carrier airborne forces should, organically, be one command and the responsibility for training and operations of such forces should rest with one commander. Certainly such an organization would facilitate planning, training, and operations. Airborne units are trained for special operations. They should not be assigned the mission of remaining for a considerable time on the front and to fight as ordinary ground soldiers. To do so would destroy their reason for being. They have trained as specialists. Ground commanders should release such units as soon a possible. The troop carrier airborne commander would see to it that the supreme commander would direct the release of airborne units at the earliest practicable time to enable them to be reorganized, trained, and equipped for future airborne operations.

Troop carrier airborne forces have already played a major role in the present war and have demonstrated their worth. It is believed that their importance to the supreme task force commander will increase as the war progresses and as the use of these forces is fully understood.

Master Bombers

From *Britain* (British Information Services) February 1945.

Advancing techniques of air warfare have created a strange new role for Britain's top aces. They now function as a sort of master of ceremonies, leading the bombers in, directing the attack, marking the targets, supervising tactics, etc. This method has resulted in greater destruction of enemy installations, and considerable economy in lives and planes for the attacking force.

TOWARDS the end of 1944 an Air Ministry communiqué stated: "Bombing was controlled throughout by master bombers who claimed that all the attacks were highly concentrated." This is the first official mention of the "master bomber," known also to the RAF for some time as "master of ceremonies." The task of the "master bombers," usually but not necessarily members of the Pathfinder force, is to identify the target visually, to check the precision of the target-indicating and if necessary order incoming machines by radio to hold their bombs until the accuracy is established, and to fly over the target during the raid, "marshalling" the bombers and giving radio orders to correct if the attack becomes scattered. They fly low if necessary, and expose themselves to the full effect of the enemy's flak and fighter defenses. Hence the "master bombers" are the pick of the RAF, selected not only for navigational skill but also for personal courage.

The Observer's air correspondent traces the following stages in the history of the "master bombers": (a) In planning the attack on Peenemunde, the "secret weapon" experimental station, the problem arose of hitting each of three small aiming points with the scheduled bomb load. The usual pathfinder technique might not have secured the exact result on such small targets. (b) Accordingly, in the raid on Turin on 7 August 1943, the successful experiment was made of having a "master bomber" over the city tell-

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ing the pathfinders by a simple code where to drop the flares. (c) The same method was used on 18 August 1943 at Peenemunde with great success. The "master bomber" flew eight times over the target to insure accuracy. The result was nearly a year's delay in the launching of the German "V" weapons. (d) In the heavy night attacks early last year on German targets in France, the "master bombers" operated with great success, as these targets were only moderately defended. The object of the RAF was to save French lives, and this was many times achieved at the cost of bringing back hundreds of fully-loaded bombers when the "master bomber" was not sure of accurate target identification. (e) Now the "master bomber" technique, originally applied to the strategic bombing of industrial targets, is applied to tactical bombing. The development of "master bombing" owes much to the work of Wing Commander Cheshire. To test the method, Cheshire, in a raid on Munich in April 1944, flew over the city at 700 feet to place the markers, and then flew over again at 1,000 feet to observe the results.

The "master bomber" guides the main force in day or night attacks in all weathers. In attacks in close support of the army, he sees that all the bombs fall ahead of the bombing line and ensures such dense concentration as obliterated Düren and Julich on the west bank of the Rhine. His first task is to go low down to check the position of the target indicators dropped by the Pathfinders, and not until the markers are in the right place does he order the main force to bomb. If the target indicators have to be relaid, he must repeat his work.

The main bombing force is as much under his control as are warships under the flagship. His responsibility equals that of a commander in the field. If bad weather threatens to involve inaccurate bombing, thus endangering civilian lives, the master bomber calls off the attack.

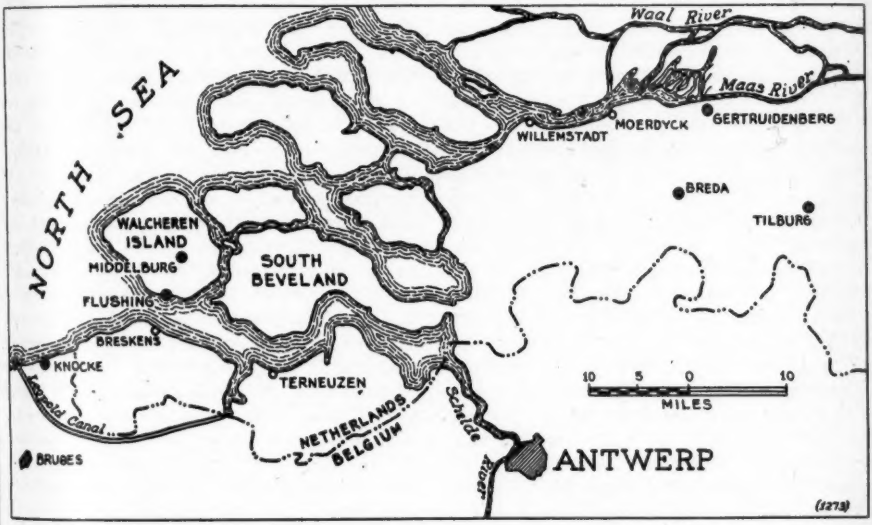
"Master bombing" is the latest of many tactics devised by RAF Bomber Command to insure bombing accuracy with a minimum of risk. The ratio of loss to machines used has been reduced to about one-sixth of what it was in 1942. Among the devices used are: (a) mass night raids to saturate defenses, beginning with the thousand-bomber raid on Cologne in May 1942; (b) "hedge-hopping" in daylight, to baffle the defenses, e.g., in the Augsburg and Le Creuset raids in April and October 1942; (c) protection of night bombers by Mosquitoes of a bomber support squadron which dislocates the German defense communications by scattered flying attacks on fighter airfields over a wide area and detects approaching night fighters with "secret eye" devices. The Bomber Support Group destroyed over 130 German night fighters for certain during 1944. The equally important object of accuracy of bombing was largely achieved by the use of Pathfinders since 1942. Their task is to drop indicators so that hundreds of bombers can concentrate the attack in a short time. In August 1944 the daytime use of Pathfinders was announced, devices having been invented to mark the targets or (if the targets were invisible) to place indicators appropriately in cloud cover, by day as well as by night. Such devices undoubtedly assisted the "master bombers" to control successfully the raid resulting in the wholesale destruction in Düren, Julich, and Reinsburg.

The Battle for the Schelde

An article in *The Tank* (Great Britain) December 1944.

THE interlude between the conclusion of the Allied pursuit after their victory in Normandy and their general offensive in mid-November was mainly devoted to a subsidiary but vital operation for the clearing of the lower course of the Schelde. At the end of the pursuit a brilliant dash by General Roberts' 11th British Armored Division had secured the port and city of Antwerp intact. This was a great prize with its twenty-six miles of

docks and its peacetime intake of 300,000 tons of goods per week, but as it stood it was of no immediate value to us, for the entry to it by the Schelde estuary was barred by the Germans. They held positions on the south bank between the river and the Leopold Canal, and also the islands of Walcheren and South Beveland to the north of the main channel



(see sketch). Farther to the east they also held a large area of territory on the south bank of the Maas right up to the suburbs of Antwerp itself. The clearing of these approaches was the task of the 1st Canadian and 2d British Armies during October and the first half of November. It was inevitably a slow and difficult business, for the country, cut up by a network of dykes and canals, lent itself admirably to a stubborn foot-by-foot defense, and the enemy troops, who fought stoutly and skilfully, made the very most of their advantages throughout.

The first attempt to clear the enemy from the area between the Leopold Canal and the river was made by the Canadians early in October, but though several small bridgeheads on the north bank of the canal were made and held, it was not found possible to widen or deepen them sufficiently to form a large enough jumping-off area for a big-scale attack. Better success attended two simultaneous thrusts farther to the east. One of these cleared the area south of the river up to Terneuzen, west of which a deep gulf intervened between the Canadians' new positions and what became known as the Breskens pocket north of the Leopold Canal. The other thrust swept the Germans back out of the northern suburbs of Antwerp right across the Dutch frontier to the mouth of the causeway connecting the mainland with the island of South Beveland, which was reached on 10 October.

At the same time a small-scale combined operation gave the Canadians a firm foothold in the Breskens pocket itself. A force was ferried across the Terneuzen Gulf and put ashore half way between there and Breskens, and though the hostile reaction was swift and vigorous and the fighting stubborn, the footing was consolidated and quickly extended to a depth of two miles. This landing was at once followed up by a crossing of the Leopold Canal at its eastern end, and the troops engaged here pressed forward to link

up with it. From this moment the fate of the German 64th Division holding the pocket was sealed, despite the continued savagery of its resistance right to the end; Breskens itself fell on 22 October and the German remnants were gradually pushed westward toward the sea until at last they were cornered and destroyed in the area around Knocke. The southern bank of the Schelde estuary was thus liberated.

On the north bank the Germans devoted their main efforts to denying to the Canadians the entry into South Beveland by the causeway, and the villages commanding the mouth of the causeway changed hands several times before the road into the island was finally cleared. Once this was done, the conquest of South Beveland proved to be easier than might have been expected; the enemy troops were apparently disheartened by the failure of their efforts to bar the entrance, in which a number of good airborne units, fighting as infantry, had been engaged. All the conditions were in favor of stubborn resistance, for large areas of the island had been flooded to a depth of water varying from a few inches to three feet, and the hostile positions on the few patches of high ground left above the water should have been easily held. But the conquest of the island was completed with little delay or difficulty, many of the enemy being apparently intent on escaping from it rather than defending it.

Meanwhile, on the mainland the right wing of the Canadian 1st Army and the left wing of the British 2d Army launched a combined offensive to clear the whole of the south bank of the Maas. This too met somewhat patchy resistance on the part of the enemy. Breda and Tilburg were quickly taken, and the enemy retired from Gertruidenberg across the river, blowing up the bridge behind him as he went. Around Moerdyck and Willemstadt, farther to the west, the opposition was more stubborn, strong rearguards being left to hold bridgeheads to cover the retreat of the main bodies; and even after the bridges here had been blown up, these men continued a fanatical and apparently pointless resistence until they were finally overrun and destroyed almost to a man.

It only remained to complete the clearance of the Schelde estuary for traffic by capturing Walcheren. This island too had for the most part been flooded after the bombs of the RAF had burst the sea wall on its western side, and the enemy only held positions on what was left of this sea wall, in the main towns of Flushing and Middelburg, and in a few smaller villages still left high and dry above the inundations. A converging attack upon Walcheren was planned by Canadian troops ferried across the Schelde from the Breskens area, and by British commando troops put ashore by the Navy on the western sea wall. It was an extremely daring and difficult operation, for on the actual day the heavy air support which had been part of the scheme of attack could not be provided owing to bad weather, and the only covering fire was furnished by the small naval assault craft armed with mortars and rockets, which closed in to the shore and took on the heavier German batteries at point-blank range. Losses among these little ships and their personnel were severe, but the task set them was accomplished; the commando troops were transported through the gap in the sea wall to land on the narrow strip of dry ground on the far side of it, and worked their way steadily through the German defenses, storming them one by one, despite the fierce resistance of the garrisons. The Canadian landings in the Flushing area went equally well, and in a few days the island was completely freed of the enemy. It now only remained to sweep the channel of the mines and other obstacles with which the Germans had strewn it. The shipping route up to Antwerp was then open, and the Allies secured a vital base port, the intake capacity of which will more than suffice for all their needs as long as the war in the west continues.

This brief account can of necessity make no adequate mention of the difficulties and hardships of these operations. The weather throughout was wet, cold, and cloudy; the low-lying ground in which they took place

was waterlogged, and our men had to wade through and stand for hours in water knee or even waist deep while preparing for or delivering an attack. The enemy positions dug deep into the dykes could often only be captured by the slow and difficult process of working along other dykes round their flanks and into their rear. Artillery could find positions only on the roads, or in some cobbled or paved farmyard nearby. In parts, the hostile defenses comprised concrete casemates and command posts very cunningly camouflaged, and pillboxes strong enough up to heavy bombardment. The bad weather practically deprived the Allied troops of their best support weapon, the cooperating air squadrons, which could rarely operate and then only for short periods at a time. Most of the fighting men lived in wet clothes for days on end, yet the sickness rate seems to have been low and the morale high throughout. The whole operation was first and last and all the time an infantry battle.

Kamikaze: Divine Winds

Digested at the Command and General Staff School from a German article by Wilhelm Schulze in *Deutsche Allgemeine Zeitung* 18 November 1944.

FOR some weeks now the Japanese press has been echoing with the exploits of the so-called "special assault [ramming] formations" of the Japanese Naval Air Force, described under the general term of *Kamikaze* (divine winds). Lately, these have been joined by special assault formations of the Army Air Force.

A high-ranking Japanese commander addressed detachments of the Army Air Force, just before they went into action a few days ago, in these words:

"We are at the decisive point in this war, where the rise or fall of our Empire is being determined. In our effort to turn the situation in our favor we cannot rely on material superiority but on spiritual force only. Therefore, our chances of winning the coming decisive battles depend on your display of this force. Returning alive is absolutely out of the question, for you are going on a mission which means certain death. Physically you will die, but spiritually you will never die. The death of a hero will be followed by the birth of millions of heroes. As you bore, with your bodies and machines, into the enemy target, you gain eternal life to the glory of eternal justice. You must, therefore, keep your bodies sound and efficient to the last moment of death. You must also keep up your ramming training to the last moment in order that your death shall not be in vain. No negligence with respect to health or training must be permitted to jeopardize the success of your ramming technique. It demands the application of all your energies to the task, in order that in eternity, also, there shall not be the least occasion for regret. Hence, I have one more word: You must not be in a hurry to die. If, when you reach your target area, you find no proper target for your attack, remember the admonition to return and start again as many times as may be necessary, till you find something worth while. In the special assault formations, it is highly important to choose that death which will produce really great results for the cause of your Empire. Do not seek, over-hastily, the death of a man in despair."

The members of these formations are volunteers. Their ages vary between twenty and thirty years. With entry into the special assault formations, each man is aware that he has begun the last phase of his life.

A single formation is small, and probably includes not more than ten fliers with ten machines. In the Navy, they all bear the common name of *Kamikaze*, meaning "divine winds," thus recalling, symbolically, the storm which prevented the Mongolian invasion of 1281. The Army formations do not as yet possess a common designation, but individual

squadrons have adopted names taken from the patriotic poem of Toko Fujita of the Meiji era, "Seiki no uta." Individual squadrons of the Naval Air Force have also made large use of this poem as a source of names, since it contains the most representative exposition of Japanese patriotism. But in addition to this, they have chosen such idyllic names as "Cherry Blossom" or "Morning Sun," expressive of Japanese sentimentality.

These formations are probably not even able to defend themselves against the attacks of enemy fighter planes, for aerial combat is not their mission. Therefore, they are accompanied by their own fighter planes. But the enemy planes probably experience a surprise, the last of their lives, when their targets, light, single-seated machines, suddenly blow up in their faces at the first shot.

Of the Naval Air Force, which was the first to engage in these tactics, more than twenty squadrons have already been cited by name in the Japanese press. This means that they have already fulfilled their task and no longer exist. Of the Army Air Force, few so far have been cited by name, but back of those that have already been named, there are, without doubt, countless formations burning with the desire of also being cited—along with all that this citation includes.

Some Good Points about the Old German Army

An article by "Archimedes" in *The Army Quarterly* (Great Britain) January 1945.

GREAT Britain may, for the maintenance of peace, find it necessary to keep up larger military forces than in the past. Germany before 1914—and all that is written here applies to that period—had worked out successfully the problem of maintaining a large, short-service army, with a good framework of officers and NCO's, at the smallest cost possible. The various means by which she managed to solve it may be of interest. Some of them may become necessary here, now that an officer of the land forces is considered too old at fifty and a soldier at thirty-five, and the Army cannot any longer be regarded as a serious profession, even "long service" in it being only temporary employment followed by almost certain unemployment.

The main problem in Germany was to compete with the life-long professions in attracting a sufficient number of suitable candidates to serve as officers and, what was more difficult with obligatory service of short duration, to secure an NCO class. The social position of officers was very high and the military career was the road to the highest appointments of State: General von Caprivi had been Chancellor, and the Minister of War and the Minister of Communications were always soldiers. It was said that the cleverest sons of the nobility went into the Army, the stupidest into the Diplomatic Service. The landowning class, however, could not provide anything like the number of officers, 30,000 required in peacetime.

The NCO question presented a different problem. No less than 110,000 were wanted in peacetime; and they had to be obtained by persuading men who had completed their obligatory service to stay on and complete twelve years.

The principal bait employed in both cases was to guarantee after-employment in the State, provincial, municipal, even parish services—that is, Social Security—to such officers who, for one reason or another, had to retire from the Army before they were qualified for a reasonable pension, and to all NCO's who had completed twelve years' good service. Two books, one for officers and one for NCO's, were published, giving (1) the appointments reserved for them; (2) those in which they had preference over civilian candidates; and (3) those for which they competed on even terms with civilian candidates. Most if not all of the places in the police, post offices, non-

technical jobs on the railways and in transport, sanitary services, hospitals, museums, parks, universities and other educational establishments, clerkships in the War Office, and employment in the Intendance (barracks, clothing, and pay) were reserved for military candidates. Incidentally, a large sum on account of pensions was thus kept off the books of the Army, as the civil services became responsible for the transferred officers and men.

Army officers' pay was small, averaging, with quarters, for a 2d lieutenant about 3s.6d a day to the British 5s.3d; but it was enough to live on and maintain one's position, for it must be remembered that the cost of living in Germany was almost half what it was in England. An officer's total pay varied with the garrison. It was made up of (1) pay according to rank, (2) command or staff pay according to employment, (3) lodging allowance (in six classes, according to the garrison), (4) supplementary lodging allowance (since 1873 as compensation for the rise in the cost of living), and (5) stable allowance. Thus a regimental captain of the 1st Class in a medium garrison received about £250 a year in all, "worth £500." A private's pay was about 10s. a month (he was compelled to serve; there was no competition with the labor market). But, though the pay was small, the privileges were many: cheap tickets at the opera and theater, cheap fares on the railway, and when an officer was moved from one garrison to another he not only had full expenses paid, but also "compensation for disturbance"—that is, a fair lump sum for damage to furniture and for resettlement. All married NCO's lived out of barracks; messes and other amenities, including a bar, were provided for the unmarried.

It should be noted that an officer had to obtain permission to marry. If the lady's position in society was thought to make it difficult for her to associate with the other wives, or his total income of pay and private means was insufficient, he was given the choice of leaving the Army or breaking off the engagement.

That young officers might get into temporary financial difficulties was recognized. To meet this, every regiment had a fund (*Offizierunterstützungs-Fonds*) for the purpose of affording pecuniary assistance to captains of the 2d Class and lieutenants who might require it.

Very important was the fact that the tradespeople in a garrison town were in the power of the Army and not vice versa. If a tradesman tried to obtain excessive prices he was warned, and if he didn't come to heel he was put on a black list. The *Militär-wochenblatt* and military magazines were run and sold cheaply, as hundreds of firms were forced to advertise in them under threat of official boycott.

Officers' uniform could be and was obtained from the military clothing establishments in each corps area. Equipment and odds and ends could be bought from a true Army and Navy Stores (*Waarenhaus für Armee und Marine*).

Regiments were, unofficially, classified according to the expense of living in them. The choice of a regiment for an aspirant officer to join depended mainly on the allowance which his parents were prepared to give him. There was a vast difference between the units of the "Golden Brigade" in Berlin and units stationed in a small town on the frontier "*in einer kleinen Garnison*" (there was a celebrated novel of this name which depicted army life in a frontier garrison). Colonels invariably inquired about the allowance which a candidate would receive, and would not accept anyone who varied much from the general average.

Only the more affluent regiments had messes as we understood them. The officers of others fed at hotels and restaurants or at home, and only met socially as a unit in their Casino building on special occasions. Visitors to the Europe Hotel in Metz will remember the number of officers who fed there—of course, at a specially low tariff.

Special schools were maintained by Government for the education of the orphans of NCO's (*Grosses Militär Waisenhaus* and *Militär Knabens Erziehungs Institut*). For officers' sons (but others might be admitted)

there were seven cadet schools and a senior cadet school. These gave a public school education under military discipline, with retired officers as teachers. According to circumstances, the fees varied from nothing up to £37 per annum (£3 for non-boarded cadets). The age of entry was from ten years. There was no special school for officers' daughters, but various institutions received them at special rates without the invidious task of having to cadge for votes.

In order to obtain the large number of junior officers required on mobilization for her Reserve formations, Germany invented the "one-year volunteer," and thus obtained men of the right class almost free of cost. For the privilege of serving one year instead of three, candidates had to be in possession of certificate of education of our "school certificate" character, and to engage to clothe, feed, and equip themselves during their recruit's service. In the mounted branches they had either to bring a horse or pay £20 to the Remount Fund. After being passed by a board, they could choose their regiment and the year and the season (on either 1st of April or 1st of October) when they would join, provided they did so before reaching twenty-three years of age. Thus a candidate could complete a University course before serving. After six months' special training under a supernumary captain, on the establishment for this purpose, the one-year men were promoted to lance-corporal and taught the duties of NCO's and young officers. Their year finished, they had to pass a practical and theoretical examination for the appointment of Reserve officer. Schoolmasters and candidates for the teaching profession served only a year in an infantry regiment and then were transferred at once to the Reserve.

As the Army increased in size and new barracks had to be built to accommodate new units, the Ministry of War generally obtained the ground and buildings for nothing. A regiment quartered in a town always brought business to it. When, therefore, new barracks were required, various municipalities were approached with a question of the kind, "If a cavalry regiment is stationed in your town, how much are you prepared to spend on building barracks for it?" Favorable replies were always received. Units and formations being really territorial, except in the case of Alsace-Lorraine, the rank and file, at least, did their service in their home town or district.

Be it noted that the German troops were invariably stationed in towns, not in remote military settlements like Catterick and Salisbury Plain. Each army corps district, however, had at least one large training area (*Truppenübungsplatz*), with hut barracks and rifle and artillery ranges, to which units went in turn in the summer months.

There was no foreign service for the National Army. The *Schutztruppen* of the colonial garrisons were raised by volunteering and their pay did not fall on Army votes.

The highest officer of the Army, the Chief of the Military Cabinet, watched over the careers of officers. Nominally *primus inter pares* of the three great officers, the others being the Chief of the General Staff and the Minister of War, he enjoyed special influence as senior ADC-General to the Kaiser and in constant attendance on him. Through the Military Cabinet all recommendations for promotion were made; but the Chief of the General Staff was left supreme in the General Staff, and he could appoint and remove staff officers; the appointment, promotion, removal, and retirement of general officers was the privilege of the Kaiser on the recommendation of the Chief of the Military Cabinet, who by custom submitted a list of three or more names of qualified officers from which His Majesty could choose.

No written rules for promotion and no age rules for retirement were ever issued. All was supposed to depend on the will of the Sovereign. Certain principles were, however, observed. First, an officer was either fit for promotion, in which case he was promoted or he was not, in which case he was given the opportunity to retire. Promotion to higher rank, especially among the generals, did not necessarily mean reemployment.

The case of one officer jumping over the heads of others could not occur. There is the

celebrated instance in 1871, when the head of the Russian Mission at German headquarters said to the old Emperor Wilhelm: "I wonder, Sir, after his great services, you do not make General von Moltke a field marshal." To which Wilhelm I replied, "But there are two generals senior to him, Vogel von Frankenstein and Herwarth von Bittenfeld [heroes of 1864 and 1866] who are not yet promoted." Secondly, the length of service in any rank was kept fairly level, throughout the arm at least, by transfer or the bestowal of brevet rank (*Karakterisiert*); but it was different from our brevet in that, being given not for good service but to regulate promotion, only senior officers of their rank received it, and the anomaly of a lieutenant colonel of a battalion having a brevet colonel serving under him could not possibly occur.

Out-of-turn promotion was only given to officers below the rank of major, and this only to officers of the General Staff and *Adjutantur*. Thus, lieutenants who had passed the *Kriegsakademie*, if employed on the Staff, were usually promoted to captain in a regiment other than their own.

Staff appointments were filled by the best officer available for the particular job, regardless of rank. Thus, turning to the order of battle of 1914, one finds that the Chief General Staff Officers of Corps (Brigadier Generals with us) were major generals (e.g., IV Corps), colonels, lieutenant colonels, even majors (I and III Cavalry Corps). When Ludendorff left the Eastern Front, Hoffmann, a colonel only, succeeded him as Chief of the General Staff East, with Chiefs of the General Staff of Armies and Corps, already lieutenant generals, major generals, etc., under him. The head of the Intelligence in 1914 was a lieutenant colonel (Hentsch). Appointment and rank did not go together.

Confidential reports were very thorough and gradually built up. The value of every bit of winter work (essays), performances at maneuvers, staff tours and war games, courses of instruction, etc., was recorded; also, how an officer spent his leisure time. No officer's fate was left at the whim of his last commanding officer.

One further point deserves notice. As the rapid training of intelligent men and "brushing up" of reservists was greatly facilitated thereby, a series of booklets was published: "What a private of infantry should know," "What a corporal of field artillery should know," etc., etc., etc., each well illustrated and containing under one cover the extracts from the dozens of regulations books exactly what the soldier or NCO of the particular arm ought to know of his duties, weapons, and privileges from the moment he arrived in barracks in plain clothes until the completion of his *Landwehr* service.

The Battle of Orsha

Translated at the Command and General Staff School from a Russian article by Major D. Saulin in *Krasnaya Zvezda* (Red Star) 11 October 1944.

Of the battles fought in White Russia last summer, the battle of Orsha was one of the biggest. It was the geographic position of Orsha and its being the most important communications center of the region that determined the scale of the battle. The city controlled the main strategic communications route of the central group of the German troops—the Minsk-Moscow trunk line—and it was for this reason that the enemy took special care of the defense of this area. Orsha had become the focal point of the German defense zone called the "Panther Line," which, in the mind of the German command, was to prevent our troops from reaching the White Russian plains.

The command of the German 4th Army had established, on the approaches to Orsha, several defense lines echeloned to a depth of twenty-five to thirty kilometers and containing up to ten trench lines. The trenches were reinforced by concrete emplacements and

bunkers built of timber and earth, barbed-wire entanglements (two to four rows), anti-personnel and antitank mine fields, and antitank ditches. For seven months the German units had been perfecting their fire system and preparing firing data for each square meter of the area in front of their main line of resistance.

Special attention was paid to fortifying Orsha itself. Here is the statement made by

Colonel Ratkliff, Commandant of the Orsha Fortified Area, after his capture: "In the winter of 1943, Hitler issued an order to transform Vitebsk, Orsha, and Mogilev into impregnable fortresses. In compliance with this order, fortified areas were created in the above-mentioned cities. The city of Orsha was girdled by two or three trench lines reinforced by forty to fifty concrete emplacements and blockhouses built of logs and earth. Stone buildings were adapted for defense, and trenches and ditches were dug in the streets. From April to June 1944, up to 1,500 men were employed daily in building the fortifications of Orsha."

The fortifications erected on the approaches to Orsha were to be defended by the elite divisions of the 4th Army, grouped into the 27th Army Corps. It was composed of the 57th, 78th, and 26th Infantry Divisions, and the 25th Motorized Division. The average strength of these divisions, as well as of the other divisions belonging to the 4th Army, was 10,750 men. The fire power and tactical density of the defense may be judged from the following data. The 78th Infantry Division and the 25th Motorized Division were reinforced by 120 assault guns, eighty tanks, seventy-eight general headquarters reserve guns, and eighty antitank guns. The total number of guns was 550. Guns averaged twenty-two per kilometer of the front. It should be noted that the 78th Division had 16,000 men. The average number of men per kilometer of the front was 500. The main centers of defense of the 27th German Army Corps were located in the zone of the 78th Division, in the vicinity of the highway and the railroad (see sketch). The operational reserve of the 4th Army consisted of eight separate regiments.

Such was the size of the German group assigned to stop the advance of the Red Army at Orsha. It is characteristic that, shortly before the offensive, the German command made all the personnel sign a pledge to the effect that they would die rather than retire without a proper order.

Due to a well-organized reconnaissance, our command had had detailed information concerning the disposition, numbers, and armament of the enemy, the location of his troops, the nature of works through the entire depth of the defense, and the fire system of the artillery and automatic weapons. It was decided to launch the main attack north of the automobile highway (see sketch) over a woody and marshy area. Simultaneously, a demonstration attack was to start along the entire front.

The German command did not even consider the possibility that our main attack would be attempted through the hardly-passable woody and marshy area. Yet only here could our troops outflank the main German fortifications and approach Orsha from the north. By making the main effort in this sector, i.e., through the weak link of the defens-

in the direction of Ostrov-Yuryev—Orekhi-Vydritza, the attackers were to split the 78th German Division into two isolated groups and threaten them with piecemeal destruction. It should be noted that, besides other considerations, this direction would enable us to attain success with considerable economy of manpower and matériel.

On 23 June, after a powerful artillery and aerial preparation which was directed at the forward edge, headquarters, and rear installations, the Red Army units launched the attack and captured the first trench line and parts of the second. The Germans committed to battle their regimental and divisional reserves of the 78th Division reinforced with tanks and self-propelled guns, but were unable to restore the situation. Then the enemy threw in two infantry divisions and launched counterattacks in the direction of Babinovichi, but this also was without effect.

By the end of this day our units operating in the direction of Orekhi-Vydritza had breached the enemy defense on a four-kilometer front and had wedged in about six kilometers. The tempo of the advance was slowed down by the swampy ground. Very often, the infantrymen had to provide the necessary power to move the artillery.

The attackers, however, advanced doggedly, knocked the Germans out of their fortifications, and uncovered the left flank of the 78th Division. We found out later that the commander of this division had requested permission from his command to withdraw his units to another line and that the request had been refused.

During 24 June the Red Army units, having seized the first line of the German defense north of the highway, approached the second line and breached it in a few separate sectors. The wedge driven into the enemy defense in the direction of Ostrov-Yuryev—Orekhi-Vydritza had been widened to as much as fifteen kilometers along the front and to as much as sixteen kilometers in depth.

At noon, several groups of our infantry escorted by tanks and self-propelled guns launched an attack from the woods in the vicinity of Orekhi-Vydritza. Supported by artillery fire and aviation, they started enveloping the flank and rear of one of the regiments of the 78th German Division. The command of the 27th German Army Corps launched a counterattack. It failed, although considerable infantry and tank forces were used.

The German 256th Infantry Division, operating north of the 27th Army Corps, had been by that time badly battered and pushed southward. The units of the 25th Motorized Division and the 110th Infantry Division, however, were still holding their positions.

During the next day, 25 June, our units north of Orsha were repelling numerous counterattacks launched by units as large as an infantry regiment and supported by tanks and self-propelled guns. At the same time, our pressure was increasing. Finally, the last line of the enemy defense was breached and our troops advanced fifteen to twenty kilometers. Into the gap thus created rushed Soviet mobile units.

During this stage of the battle, the Germans committed their last remaining army reserve. This resulted in a number of meeting engagements, in the course of which the enemy suffered heavy losses and was routed.

Swiftly exploiting their success, the Soviet troops prevented the enemy from consolidating on successive positions prepared in advance. According to the commander of the 78th Division, Major General Traut, our troops kept on the heels of the Germans and often reached new positions simultaneously with the retiring German units. As we found out later, Traut, to save the 195th Regiment, had ordered the regimental commander to leave the fortifications near the highway and withdraw toward Orsha. Later on, this led to the uncovering of the flank and rear of the German units fighting south of the Dnieper. During the night of 26 June these units, under the pressure of our troops, began withdrawing over the Dnieper.

Further events developed as follows. On 26 June our mobile units captured Kokhanovo and cut the railroad and the highway. The 27th German Corps lost its routes of supply. This corps was now half encircled.

Toward the evening of the same day our mobile units broke into the outskirts of Orsha from the northwest and west. Thus, the city of Orsha was doomed. The 78th German Division had lost contact with its left neighbor and had used up all its reserves. It continued to retire in disorder under the cover of rearguards. But the pressure of our units was still increasing. Having destroyed the rearguards and delaying groups, they stormed and captured Orsha on 27 June.

The remnants of the German divisions were now crossing the Dnieper. Deprived of the railroad and the highway, they were retiring in disorder, losing men, trains, and matériel. Commenting on these divisions, Colonel Ratkliff said this: "In the vicinity of Kopys, there were remnants of the 25th Motorized, 78th Infantry, and 337th Infantry Divisions; all together, 15,000 men. The staffs of these divisions had abandoned their troops, and they were the first to go across the Dnieper."

Our troops pursued the enemy from Orsha along the Minsk highway. Cooperating with the partisans, they drove the enemy to the place of his final destruction—the Minsk area. The following excerpt from the diary of a German officer is interesting: "A march of nightmares and horrors has begun. Fantastic bottlenecks on the roads. Panicky stampede. Russian tanks blocking the routes of retreat. Russian aircraft incessantly sowing death from the sky. The Russians outstrip us all the time by parallel pursuit. Partisans are destroying bridges."

What, then, are the general conclusions to be drawn from this operation? Detailed information about the enemy, obtained by a well-organized reconnaissance, helped in finding a weak spot in the enemy defenses and in inflicting on him a devastating blow. The main effort was made north of the highway in a hardly passable woody swampland, and this constituted the element of surprise. Moving through this area, our troops were able to outflank the powerful hostile fortifications and attack the flank and rear of the Orsha enemy group.

In breaching a strongly fortified defensive zone and in exploiting the success in the enemy rear areas, our military leaders manifested high qualities of leadership. Alternating blows threatening the Germans with encirclement forced them from advantageous positions into a disorderly retreat. One swift maneuver was followed by another, thus creating a high tempo of advance.

The loss of Orsha resulted in the subsequent destruction of the remnants of the German group around Minsk. The formidable "Panther Line" was overcome, and the road to the west was now open.

The Indian Armed Forces

Digested at the Command and General Staff School from "India at War," a pamphlet distributed by the Government of India Information Services.

THE pre-war strength of the Indian Army was 182,000. Today the Army numbers over 2,000,000, all of whom are volunteers.

The pre-war Indian Army was armed and organized mainly for internal security and frontier defense. The general reserve, or Field Army, consisted of only three brigades. The need for mechanization was realized, but the necessary equipment could not be obtained from the United Kingdom. India's military problem has therefore been to expand her forces and at the same time to revolutionize their training.

Recruitment to the officer class, both King's commissioned officers and VCO's [Viceroy commissioned officers], has increased. The Indian Military Academy, which before the war accommodated about 200 cadets, has been enlarged to take 600, while other Officers' Training Schools have been opened. At the outbreak of war there were 400 Indian officers; by January 1944 there were 9,000

Indian officers were thirty-five percent of the total in October 1943 and the percentage is increasing.

Existing training schools have been very greatly increased and many new ones opened. These include a Tactical School, a Fighting Vehicles School, an Infantry School (which teaches minor tactics as well as the handling of infantry weapons), a Jungle Warfare School for officers and noncommissioned officers, in addition to the Antiaircraft Artillery Training Centers, etc., which have been opened for the recruits of the various arms. Indian infantry and Gurkha reinforcements for the Eastern Theater undergo intensive training in the jungle.

Technical Training Centers for Ordnance and Motor Transport Artificers have been inaugurated. There are also schools for Engineers, Signallers, Supply and Transport technicians and others. Many recruits have to be given a general education before they can learn to handle complicated modern weapons and equipment. Large schools have now been opened for training boys so that when they reach army age they can join up immediately as fully qualified technicians.

New corps of Indian Engineers and Indian Electrical and Mechanical Engineers (IEME) have been formed. The Indian Engineers cover a wider field than the prewar Sappers and Miners, ranging from artisan works and mechanical equipment companies to railway and docks operating companies. The IEME have taken over the vastly increased work of the maintenance of mechanical and electrical equipment.

Paratroop battalions have been raised and Indian and Gurkha troops are showing themselves well suited for this service. Parachutes are being made in India from Indian silk.

On the mountainous and jungle-covered Indo-Burma border where roads are scarce, considerable numbers of animal transport units have been raised in addition to those retained on the rugged North-West Frontier.

The Indian Army Medical Corps was formed in 1943 by amalgamating all branches of the Indian Military Medical Services, the Indian Medical Services, the Indian Medical Department, and the Indian Hospital Corps. By the middle of 1943 more than 300 major field medical units had been raised in India. They are functioning wherever Indian Army units are serving. Large hospitals have been built and staffed, and many new medical training schools have been opened. Women doctors are now recruited, with full liability for service in and out of India. The Army Nursing Service has been raised for work with the new medical units and hospitals.

A Women's Auxiliary Corps numbering over 10,000 has been formed to release soldiers and technicians for more active duties. They work as switchboard operators, wireless operators, clerks, dispensers in hospitals, etc. The officers also replace staff officers in the larger headquarters. A naval wing of the WAC has been formed for duties with the Royal Indian Navy.

More than 300,000 members of the Indian Army have been sent overseas. They have served with distinction in the defense of East Africa and the Sudan, in Eritrea, Abyssinia, the Western Desert, Tunisia, Italy, Syria, Persia, Iraq, Malaya and the East Indies, Burma, and Hong Kong. A small detachment of animal transport units served in France.

The Royal Indian Navy

The personnel of the Royal Indian Navy has increased from 1,200 officers and men at the time of the outbreak of war to nearly 30,000 by the beginning of 1944. Recruits were being enlisted at the rate of 1,000 per month in 1943. The new vessels being turned out include escort vessels, motor torpedo boats, minesweeping vessels, motor launches, and fast submarine chasers.

India's Navy has every type of technical training school needed for a fighting navy. A new torpedo school and a new antisubmarine school, the largest in the British Commonwealth outside the United Kingdom, have been built. The School of Naval Gunnery has been enlarged since the war and the number of ratings taking the gunnery course has increased fifteenfold.

Two major naval bases have been built and three minor bases fitted with the needs of a modern naval base. The Royal Indian Navy's dockyard at Bombay refits vessels, makes repairs, builds light craft, and carries out the degaussing and arming of merchant ships.

When Malaya was invaded, ships of the Royal Indian Navy were busy in the Malacca Straits and the Java Sea.

The Royal Indian Navy did particularly good service off the Burma coast in support of operations on the Arakan front. The evacuation of 40,000 Indians from Burmese ports was organized and carried out when that country was invaded. In 1943 the Royal Indian Navy took part in convoy operations escorting the Eighth Army, reinforcements, and supplies to Sicily from North Africa.

During 1942 the ships of the Royal Indian Navy steamed 812,290 miles while protecting the coasts and routes used by merchant shipping. On antisubmarine patrols they covered 237,220 miles, making many attacks, and another 383,150 miles escorting merchant ships.

By June 1943, 16,000 Merchant Navy officers and men had been trained in the use of defensive armaments, and a new training depot established, where 2,000 Indian youths will receive instruction.

The Indian Air Force

By the beginning of 1941, recruitment for the quadruple expansion of the Air Force, which is almost entirely Indian, was completed. Expansion continued in 1943, and machinery was set in motion for its completion as a self-contained service. The first batch of trainees from India went to Canada under the Empire Air Training Scheme in 1943. The IAF by the end of 1943 had seventeen technical and non-technical schools. These schools catered for all trades connected with the IAF. Besides these technical schools, there are Flying Training Centers. Over fifty percent of the instructors at these centers are Indians. There is also an important civil aviation training scheme designed initially to turn out 300 pilots and 2,000 ground staff per year for two years.

The Coastal Defense Wing has been expanded and seventy-five percent of its personnel is Indian. Since its formation in 1940 its planes have flown thousands of miles escorting the huge supplies of men and materials that India is sending abroad.

Squadrons of the IAF operating from India have been fighting over Burma since 1942. They are equipped with modern aircraft, both fighter and bomber, supplied in large numbers from India.

German Self-Propelled Guns

From a British source.

IT seems to be the fashion nowadays to name our latest equipment after animals, reptiles, and insects. We have Crocodiles, Wasps, Scorpions, Crabs, and many more. The Hun has Tigers and Panthers, as we know well; and he has, besides, the Rhinoceros, the Elephant, the Grizzly Bear, the Wasp (which is *not* a flame thrower), and the Bumble Bee (which is *not* a boat). Confusing, isn't it?

The last five animals and insects in the German Army zoo are all self-propelled guns, either howitzers or tank destroyers, and it is about these that we are going to talk.

The Hun now has over fifty different self-propelled guns. Self-propelled weapons were born of improvisation and adaptation. The Huns hadn't thought of using them on a wide scale before 1940, except for the assault gun (7.5-cm *Sturmgeschutz*) which appeared in the Battle of France and light ack-ack on half-tracked mountings which were used in Poland.

They had learned in the Spanish Civil War that vehicle columns on the march needed something more than machine guns to defend themselves from strafing by low-flying aircraft. So they improvised by mounting their

light ack-ack on half-tracks. They then found that these self-propelled guns were also very useful against tanks and in an assault role.

In Poland the Huns learned that ordinary towed antitank guns had certain disadvantages, and by the spring of 1940 they had introduced self-propelled guns, economically using up various obsolete or captured tank chassis for mountings. Hence the 47-mm Czech antitank gun, the 3.7-cm *Pak*, and the 47-mm tank destroyer on the German Mark I and the French R-35 tank chassis. These turned up in the Balkans and North Africa in 1941.

But the Hun still did not realize the full possibilities of self-propelled artillery. Not until the Russian campaign did he stop improvising and start taking his self-propelled guns really seriously. The standard infantry 150-mm howitzer was now mounted on the Mark I and II tank chassis, and on the Czech 38 (t). The 7.5-cm *Pak* 40 appeared on Mark II and 38(t) motor carriages, and also on the French Lorraine tractor.

Captured Russian 76.2-mm M36 field guns were mounted on various chassis to make tank destroyers, and by the middle of 1942 the first big specially-designed self-propelled field gun was doing its stuff in Russia: the 10.5-cm *le F.H.* 18 on the Mark II tank chassis, nicknamed the "Wasp." For the first time, the carriage had been properly adapted, with engines moved forward to make room for a fighting compartment. For the first time, a self-propelled field gun was not just a gun stuck on top of a cut-down obsolete tank.

The year 1943 produced all sorts of such equipments. There was the 8.8-cm *Pak* 43 on a Tiger-tank chassis—formerly called the "Ferdinand," now known as the "Elephant." The modified 150-mm infantry howitzer (15-cm *Stu.* H.43) appeared on a Mark IV chassis, and was christened the "Grizzly Bear."

It is possible, too, that three other important self-propelled weapons were already in existence at this time, though we didn't meet them until later: the "Hornet" (now designated the "Rhinoceros")—an 88-mm antitank gun on a mixed Mark III and IV chassis; the "Bumble Bee"—the 150-mm gun howitzer on a similar carriage; and the assault gun 7.5-cm *Stu.* K.42, which mounts a modified Panther tank gun on a Mark IV chassis.

Some of these abbreviated designations need a little explanation. *Sturmgeschutze* (*Stu.*) means a motor gun carriage adapted for an assault gun or howitzer. *Geschützewagen* (*Gw*) is an adaptation for field artillery. *Pak* (*Panzerabwehrkanone*) means antitank gun, and *Panzerjäger* means a tank-hunting gun or tank destroyer, as we call it. This shows us the roles in which we may meet German self-propelled artillery; and it is plain that, as production jobs, they fall into three classes—first-line weapons, well-engineered conversions, and makeshifts.

You may find the Hun's self-propelled guns working in close cooperation with infantry, helping them forward like assault guns, and they'll engage you at much the same ranges; but more commonly they use indirect fire and work like ordinary artillery at correspondingly longer ranges. When they're on the defensive, they'll engage all kinds of targets. They specialize in buildings and troop concentrations, often acting singly, each choosing its own target. They seldom fire on the move, though they "rove" very quickly to new positions.

In withdrawal, their usual job is to cover the rearguard infantry. The infantry withdraws first under cover of darkness, sometimes leaving sappers behind for mines and demolitions. The self-propelled artillery follows one troop, leapfrogging another. One gun may be left with extra ammunition giving covering fire till daybreak.

In defense, the Hun often uses his self-propelled guns to support counterattacks, and can speedily move them to any point which is threatened with a breakthrough.

You'll meet them in Italy, and troops on the Western Front will meet them in Germany too, for there is evidence that the Hun is abandoning his faith in static defenses as the Allies break through the Siegfried Line, and pinning his faith on mobile defenses, in which self-propelled equipment will play a large part.

How will German self-propelled guns de-

velop? The Hun is always seeking a heavy carriage capable of carrying a still more powerful gun. On the other hand, he doesn't want to sacrifice speed and mobility. So it appears that the 88-mm Panther tank-destroyer is the best all-round job in this line so far, and he'll probably modify the same chassis for field and assault guns—if there's anything left of his factories after the Allies' airmen have finished with them.

Tactical Photo-Reconnaissance

Digested at the Command and General Staff School from an article in *The Aeroplane* (Great Britain) 23 June 1944.

A GREAT deal has been written at one time or another about the Royal Air Force Photographic Reconnaissance Unit, but little, if anything, on a certain Photographic Reconnaissance Wing, a special branch of the RAF photographic service.

One of the Wing's main tasks just now is to discover with certainty how much more bombing and strafing may be needed to wipe out some particular target, for the Wing forms part of the Tactical Air Force and its work is essentially of a tactical nature. Pictures of enemy road and rail movements, often with special reference to the type of material carried, as, for example, tanks on railway trucks, can be of very great importance.

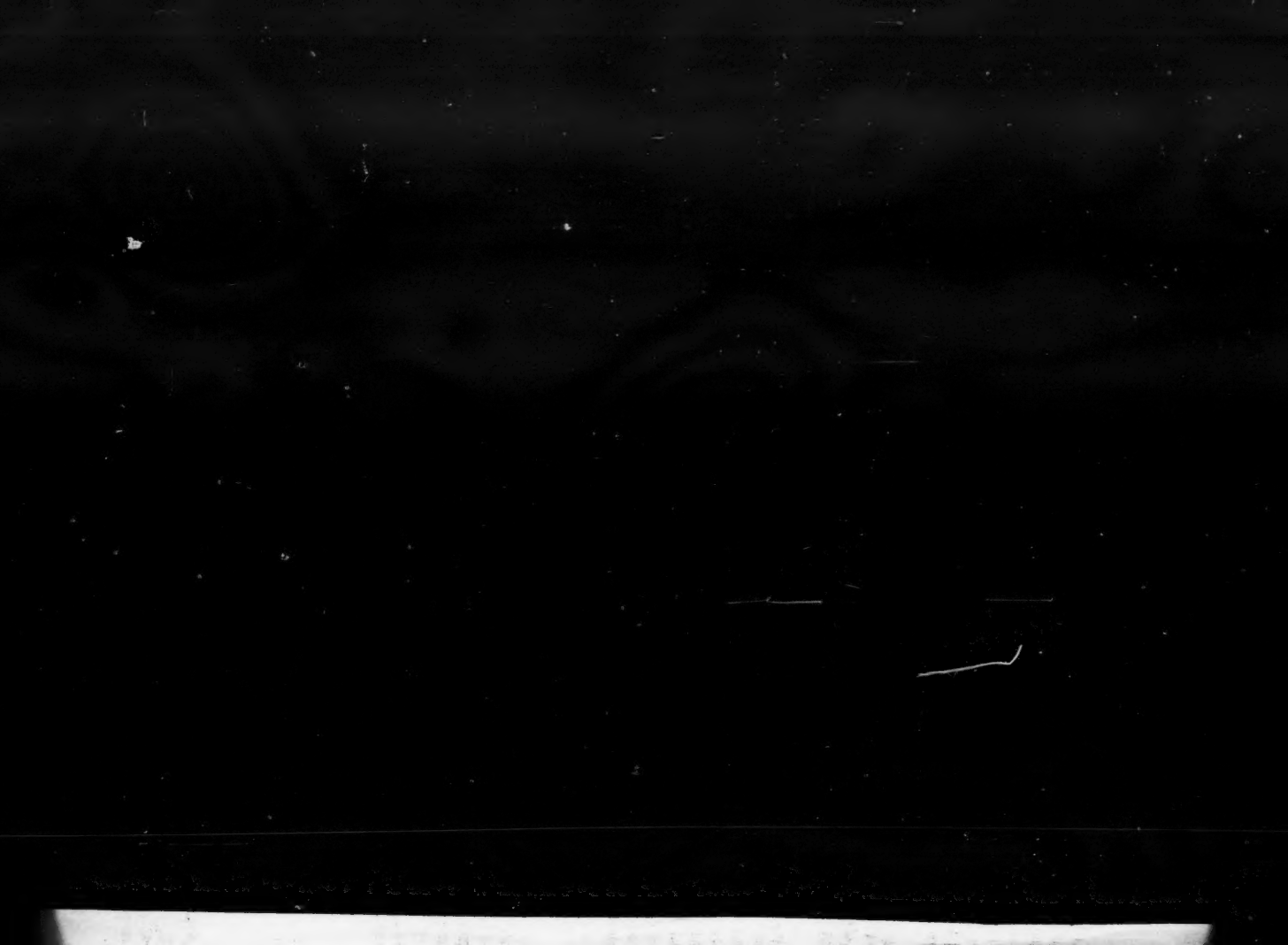
Spitfires and Mosquitoes are used normally by the Wing, pilots operating as a rule at 30,000 feet. In bad weather they may have to come down to 5,000 feet, but during invasion week the weather was so bad that at times the pictures had to be taken from 1,500 feet. Spitfires are used for the most part when flying conditions are fairly good, the Mosquitoes being reserved for work in really dirty weather. Guns are not necessarily mounted and the Spitfire may be, to all intents and purposes, an unarmed flying petrol tank which carries two cameras in the tail and two more in the wings.

A 36-inch (focal length) lens is employed for high-altitude photography, and a 20-inch or 12-inch for lower levels. Pilots when briefed are given maps on which their course line is marked out with times and indications as to whether any particular section needs to be covered more than once. When the films have been developed and printed at base, they pass through a sort of operational "filter." Pictures which may be of immediate service in giving important information to ground troops are directed instantly to the army headquarters interested.

Where a special sortie may have been asked for by a commanding officer in the field, the required information may reach him in astonishingly rapid time. An army divisional commander may, for instance, wish to know whether a certain railway behind the enemy's line has been cut by bombing or long-range artillery fire. He asks the RAF for a special investigation sortie, and within an hour and a half after the pilot gets back to base the information is available.

Strategic aerial photography is looked after by the Royal Air Force Photographic Reconnaissance Unit, whose excellent pictures of blitzed cities in Germany are familiar.

One important example of tactical aid photography may be cited. The first step in setting up a small landing strip is the selection of suitable ground immediately area has been cleared of the enemy. This undertaken by advance reconnaissance unit of the Royal Engineers, assisted in the work by pictures which the RAF have obtained for them.



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